Title Facilitating organisational creativity: Exploring the contribution of psychological, social and organizational factors

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ABSTRACT

Towards the end of the first decade of the 21st century the economic downturn increases the significance of creativity and innovation to business success. As the seed of innovation or fuel for the innovation engine creativity is important throughout the process in distinguishing successful innovations. However, many organisations struggle to transform the rhetoric of creativity and innovation into reality because of a lack of understanding of what this means or how to achieve this. Fragmentation of existing research leads to ambiguous evidence with a danger of spurious relationships or confounding of factors that is inadequate to advance theoretical understanding and inform practice.

This investigation provides a number of valuable contributions to overcome such limitations through systemic analysis of individual, social and organisational factors that support creativity based on a research strategy of multiple case studies and employing quantitative and qualitative techniques. Empirical investigation employing both the KEYS assessment of creative climate and personality characteristics is rare. Findings reinforce the contribution for four of five factors deemed most important to supporting creativity together with the *Openness to Experience* personality dimension. The presentation of a general linear model explains 47% variance based on *Organisational Encouragement, Challenging Work, Work Group Support, Organisational Impediments*, and *Openness to Experience.* Alternative models suggest *Openness to experience* moderates the significance of climate factors. For individuals very high on this personality dimension the interaction of *Challenging Work* and *Work Group Support* contributes 60% variance in creativity.

Qualitative investigation extends the variance contributed by the general linear models to include the significance of shared understanding and meaning, the need for continuous active stimulation and supportive

mechanisms, passion or love for one's work and freedom to voice ideas. Finally, synthesis of creativity theories with HRM and HRD extend and advance theory and practice in a number of ways that have implications for the limitations of KEYS and for models of SHRM. Results extend existing knowledge and understanding of facilitation and implications are explored in-depth for organisations aspiring to creativity and innovation

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Chapter 1: Introduction

Organisational effectiveness, competitiveness and survival within a rapidly changing, dynamic, highly competitive global business environment frequently depend on new ideas leading to new ways of organising and doing business. The creative revolutions of the 21st century workforce and workplace lead to the fostering of creativity as a necessity rather than an option (Gibb and Waight 2005:101). That business can no longer necessarily follow time-tested formulas of precedent, they must be able to produce and be receptive to creativity and innovation (Williams and Yang 1999:5) also becomes very clear from recent government interest and initiatives to improve business innovation within the UK. For example, a study recently commissioned by the Chancellor from the Department for Trade and Industry (DTI) aimed at helping firms to identify how creativity can improve their performance suggests "successful companies will look not only to research and development (R&D) or design as specific creative inputs, but seek to promote creativity in all parts of the organisation." (DTI 2005:vi). This raises the very pertinent point that employees in any position and at any level can benefit the organisation by being creative. This applies to all jobs rather than just those traditionally considered as necessitating creativity, such as the creative industries or research and development (Axtell, Holman et al. 2000; Madjar, Oldham et al. 2002; Madjar 2005). The review accompanying the aforementioned DTI report on supporting and developing creativity in small and medium sized businesses suggests,

> "Sustained success in business – regardless of sector – increasingly depends on the ability to innovate: to exploit new ideas and new opportunities ahead of the competition." (Cox 2005:10)

> "Creativity, properly employed, carefully evaluated, skilfully managed and soundly implemented, is a key to future business success – and to national prosperity." (ibid.:3).

In the few years since the publication of this report, the UK has faced even greater challenges and, at the time of writing in 2009, is in economic recession. Such a climate places even greater demands on organisations to be more creative and more innovative – to exploit new ideas and new opportunities ahead of the competition.

However, creative idea generation does not appear common for most individuals (Egan 2005). For many organisations, aspirations towards creativity and innovation are blocked because of perceived risk or a lack of understanding of how to generate and implement creative ideas, manage the creativity and innovation processes, or because they are unaware of what to be creative and innovative actually mean. Evidence from a relatively recent investigation suggests "firms are more than happy to use the concept of innovation in their advertising and corporate PR, but sustained behaviour in practice seems to present managers with a difficulty" (Storey 2000:348). Extensive differences are suggested by Storey between managers in the same company, even among managers in the same top-level teams, about the actual meaning of the injunction to be innovative and the priority accorded to it. A lack of understanding of how the organisation would need to behave to facilitate this objective and the types of innovation deemed to be required demonstrates confusion in organisations between the rhetoric of creativity and innovation and its application in practice. As Storey suggests, successful exploitation of new ideas has to overcome competing expectations, strategies and rationales in addition to institutionalised routines and inertia.

In the context of the current "knowledge economy" in the UK, (whether or not this is likely to be enduring presents a different argument beyond the

scope of the present study) creativity and innovation become increasingly important and "Indeed, understanding creativity should be part of equipping everyone for life and work in the 21st century." (Cox 2005:28). Of 88 companies responding to a UK survey 84 percent regarded innovation as critical or important (Searle and Ball 2003). Others suggest that "Many companies still regard innovation as an irritant, something that gets in the way of 'real work'.", (Basadur and Gelade 2006:61). However, if business organisations are to transform rhetoric into reality, it is critical to raise awareness and understanding of what creativity and innovation mean in practice and to provide clear recommendations on how to facilitate these processes.

1.1 What does it mean to be creative and innovative?

Creativity and innovation represent terms that mistakenly tend to be used interchangeably. For example, creativity has been defined as "the application of imaginative thought, which results in innovative solutions to many problems" (Goodman 1995:86). It is suggested that management of the innovation 'problem' (Storey 2000) is more precisely defined as management of the creativity and innovation problem. The need to differentiate between the meanings of these phenomena is increasingly important, particularly if supported by different individual, social and organisational factors.

1.1.1 Creativity

Creativity represents a multifaceted phenomenon that is difficult to define precisely. The attribution of some authors to Einstein and Feynman suggesting that creativity is "Seeing what everyone else has seen, and thinking what no one else has thought", (Swann and Birke 2005:3) is interesting and intuitively correct to experts in the field. However, is this informative to raise awareness of non-expert practitioners? Is this enlightening in advancing understanding of what it means for organisations to be creative and how to facilitate this in practice?

More than half a century ago (Stein 1953) defined creativity as "that *process* which results in a novel work that is accepted as tenable or useful or satisfying by a group at some point in time". More recently creativity has been described as a *process* of continuous improvement, a continuous finding and solving of problems (Basadur 1993). Gardner defined the creative *individual* as "a *person* who regularly solves problems, fashions products or defines new questions in a domain in such a way that is initially considered novel but that ultimately becomes accepted in a particular cultural setting" (1993:35). Simply it is suggested, "Creative thinking brings about new things – innovations. Creative people are those who produce such innovations and the creative process consists of the psychological processes involved in bringing about innovations."(Weisberg 2006:1). Amabile suggests "Creativity is ... the production of novel, appropriate ideas in any realm of human activity from science, to the arts, to education, to business or to everyday life." (Amabile 1997:40). This is reflected in the report recently commissioned by the UK government "Creativity is defined in this report as the production of new ideas that are fit for a particular business purpose" (DTI 2005:iv).

Increasingly consensus identifies two key elements of both conceptual and operational definitions of creativity as novelty or originality, and usefulness, or appropriateness, value, acceptability (Taylor, Smith et al. 1963; Gardner 1988; Mumford and Gustafson 1988; Amabile 1996; Sternberg 1999). The above definitions clearly highlight creativity as a process, a product or outcome, and ability. Whilst usefulness, appropriateness or value form an important part of most definitions of creativity it is the novelty or originality that provides the dominant focus of interest within the creativity literature.

1.1.2 Innovation

Conversely, within the innovation literature, the dominant focus of interest is value or usefulness, reflecting the lesser importance of originality at the implementation stage compared to social validation, acceptance and commercial viability. Organisational innovation can be defined as "the

successful implementation of creative ideas" (Amabile 1988:126). However, an alternative definition includes the *development* and implementation of new ideas (Damanpour 1990) which suggests the inclusion of creative idea generation. This is not helpful in informing either theory or practice. Innovation might also involve the introduction of organisational processes imported or adopted from elsewhere (Damanpour 1990). Therefore, not all innovations are necessarily the result of creative processes, particularly as a diffusion bias has been noted towards innovation being imported rather than internally generated (King 1990). This 'same as' approach to ideas already tried and tested elsewhere, while comprising less risk, by definition, lacks originality.

1.1.3 Relationship between creativity and innovation

Creation of new ideas has far greater potential for developing sustainable competitive advantage in the dynamic business environment of the 21st century. Idea generation is a relatively less costly stage of the innovation process in comparison to the later development stages (Rochford 1991) and it is logical and economically prudent to maximise the output of the idea creation phase with the likelihood that increased competition between ideas will ultimately improve the quality of potential innovations (Flynn, Dooley et al. 2003). Indeed there is growing evidence not only that employee creativity contributes significantly to innovation, effectiveness and survival (Kanter 1988; Amabile 1996) but it is suggested that "...without creative ideas to feed the innovation pipeline so they may be promoted and developed, innovation is an engine without any fuel" (McLean 2005:227). Some evidence is emerging in support of idea-rich environments. One study, for example, found that organisations earning more from new products and services were nurturing on average 115 ideas per day, compared to 18 for an average organisation (Davis 2000). Another study based on industrial organisations found that it took 3000 raw ideas to produce one substantially new and commercially successful new product, and suggested that for other companies the number of raw ideas may be higher, at 6000-8000 (Stevens and Burley 1997).

For the purposes of the study in hand creativity is defined as the generation of original ideas appropriate for the intended purpose, and innovation is defined as the implementation or exploitation of creative ideas, but also including adoption of ideas imported from the external environment. For organisations to be innovative, creative solutions are required; creativity is not only the seed of innovation (Amabile, Coon et al. 1996) but also potentially plays an important role across level of analysis and throughout different phases of the innovation process. It has been suggested that creative acts are the definitive episodes that distinguish successful innovations from less noteworthy efforts (Ford 1996).

Of course, definitions of 'originality' and 'value' are also highly subjective. For example, is an idea creative if it is new to the person having the idea regardless of how many times others people have already had that idea? Experts in the field of creativity distinguish between two senses of creativity. The first is psychological, or P-creative, and refers to valuable ideas that the person in whose mind it arises could not have had it before. The second is H-creative and refers to valuable ideas that are P-creative and no one else, in all human history has ever had the idea before (Boden 1994:76-77). Similarly further definitions include creativity with a capital C to refer to cultural creativity (Csikszentmihalyi 1996), while also acknowledging personal creativity. The focus of this study is on facilitating organisational creativity and innovation and therefore on P-creativity, a more or less sustained capacity to produce P-creative ideas, whilst not excluding much rarer H-creative ideas, within the context of cultural creativity, at a period of time in history where business conditions are ripe in recognising the necessity of creativity and innovation.

This also begins to highlight differing conceptions of 'value'. For example, to the person having the idea, P-creative ideas are valuable. However, social validation of a creative idea ultimately determines whether or not that idea will be adopted and implemented and, as such, represents a

bridge between individual and organisational creativity, between creative idea generation and exploitation. The complex social institution in which new ideas are implemented must value outcomes of the creative process. On this basis, creativity can be seen as an intrapersonal, psychological process while innovation depends entirely on interpersonal, social and organisational factors.

> "The ability to innovate, in turn, depends on the availability and exploitation of creative skills. In a real enterprise culture, these needs create a virtuous circle: for sustained innovation and growth companies need to be able to draw on the talents of a flourishing creative community; for innovation to flourish, the creative community needs to be responding to the demands of dynamic and ambitious businesses." (Cox 2005:10)

Individual creativity is not something that occurs in a vacuum. It is context dependent and involves complex interactions of the individual with the social and organisational environment that leads to new and appropriate ideas. This leads to the perception of creativity as a subjective phenomenon that confounds intrapersonal, psychological factors with interpersonal, social and organisational factors. It is also likely that different factors are of greater significance at different stages and it becomes necessary to differentiate between the creativity and innovation processes to enhance the theoretical understanding and the practical application in facilitating organisational creativity and innovation.

1.2 Understanding how to facilitate creativity and innovation

Regardless of the applied and theoretical importance of understanding antecedents, processes and dynamic interactions, these remain underdeveloped, particularly in respect of how to facilitate creativity and innovation within complex social settings (Amabile 1983; Mumford and Gustafson 1988; Woodman, Sawyer et al. 1993; Ford and Gioia 1995) typical of business organisations. Mired by fragmentation of research

emerging from disparate disciplines (Wolfe 1994; Dougherty 1996; Tidd 1997) the gap remains between the rhetoric of creativity and innovation and effective practice.

Creativity has tended to be researched almost exclusively from a psychological perspective, emphasising individual characteristics and cognitive and social processes as antecedents to creative outcomes. On contrast, innovation research has focussed on adoption and implementation processes within complex social settings, such as business organisations, from sociological, economical or organisational studies perspectives. Not surprisingly, it has been suggested that creativity and innovation researchers tend to inhabit different disciplinary worlds and have failed to capitalise on potential synergies (Ford 1996).

However, differences between creativity and innovation research appear due to relative emphasis on specific factors rather than irreconcilable differences. A review of the research literature suggests much scope for synergy between the disciplines. Both are developing interactive process theories where each would benefit from the expertise of the other in developing integrated theories of dynamic, temporal and cyclical interactions between the individual and the organisation.

The interactive models arising from the creativity research literature (Amabile 1983; Sternberg and Lubart 1991; Woodman, Sawyer et al. 1993) all propose the need to understand the dynamic, temporal interaction of individual, social and organisational characteristics. Clearly, the movement of innovation research towards an interactive process model (Van de Ven 1986; Van de Ven and Rogers 1988; Schroeder, Van de Ven et al. 1989; Van de Ven, Angle et al. 1989) has much in common with current approaches to creativity research. This results in increasing attention to the determinants of creative behaviour (Scott and Bruce 1994; Amabile 1996; Amabile, Coon et al. 1996; Oldham and Cummings 1996;

Zhou 1998; George and Zhou 2001) to both further develop theory and to enhance work practices on the basis that creativity is the starting point for organisational innovation.

The very complexity of the interactionist perspectives calls for a systemic approach that poses difficulties for empirical investigations. Research undertaken to date focuses on specific elements of psychological, social and organisational factors in isolation (e.g. Shalley 1991; Scott and Bruce 1994; Shalley 1995; Oldham and Cummings 1996; Tierney, Farmer et al. 1999; George and Zhou 2001; Zhou and George 2001; Madjar, Oldham et al. 2002; Tierney and Farmer 2002; Zhou 2003; Madjar 2005; Ensor, Pirrie et al. 2006). While many studies provide useful outcomes and some have been very influential, this leads to ambiguous, fragmented evidence that illuminates only part of the picture and does little either to advance the understanding of creativity and innovation or to inform practice. Chapter 2 explores this body of research in greater depth.

1.3 The role of Human Resource Management and Development

Interest in organisational creativity is increasingly evident from some human resource management (HRM) professionals and academics in general but particularly from the perspective of human resource development (HRD) where some suggest, "...that HRD, as a discipline and a profession seeks to identify, support and lead the creative revolutions of the 21st century workforce and workplace." (Gibb and Waight 2005:271). Therefore, this research has important implications for HRM and HRD. Translation into practice of factors supportive of creativity might be clear for the HRM specialist yet for generalist and line managers is likely to prove more elusive. Responsibility for HRM practices is frequently devolved to line managers and actual implementation might vary from senior management intentions. The effectiveness of practices then become subject to the attitudes and perceptions of the workforce in determining behaviour and performance outcomes. Even companies who successfully translate aspirations to creativity and innovation to

organisational strategy, there frequently exists a failure to translate this into coherent HR practices (Searle and Ball 2003). Some contributors exploring the connections between creativity and HRM offer useful models (e.g. Leede and Looise 2005; Jørgensen, Laugen et al. 2007). Yet these remain limited by the absence of research on interactive approaches at the level of the organisational system.

Creativity, innovation and knowledge management are all responsive, dynamic processes that depend upon the interaction of the individual with the social and organisational environment. However, empirical investigations based on interactions of individual, social and organisational factors appear rare. There is a clear need for reliable research to inform practice (e.g. Egan 2005; McLean 2005) and this dissertation is a first step in filling that gap. To develop a model of both theoretical and practical significance it becomes critical to evaluate the significance of those factors deemed to support organisational creativity. Therefore, the purpose of the current work is not to evaluate specific HR policies and practices but, through a systemic, interactive approach, to determine the contribution of individual, psychological, social and organisational factors in facilitating creativity. This will include exploration of implications for HR policy, practices, and HRD. The development of a model in this way enhances theoretical understanding and practical application of how to stimulate, support and sustain organisational creativity.

1.4 **Summary**

This research investigates the major factors deemed to contribute to creativity, based on Amabile's componential model (Amabile 1996) and the similar interactionist model of Woodman et al (Woodman, Sawyer et al. 1993). Both emphasise the interaction of individual, group and organisational factors and hence a systemic investigation has been undertaken. This includes individual characteristics that are rarely included but potentially make a significant contribution.

This investigation uses the KEYS (Amabile, Burnside et al. 1999) survey of climate for creativity that assesses perceptions of influences at several levels within the organisation on the basis that respondents' perceptions reflect the psychological meaning of the work environment and influence on creative behaviours. Amabile's model draws on high versus low creative companies across a number of sectors. Recognition of the reality is that a majority of companies are likely to fall somewhere in between and it is important to explore the implications of the interactionist models in typical organisations. Further unique insight is provided in a number of ways. Individual characteristics were measured using the NEO Five-Factor Inventory (NEOFFI), a short version of the NEO-Personality Inventory (Costa and McCrae 1992) that has been shown to reliably measure the Five-Factor Model of personality validated by organisational psychologists (Wiggins and Trapnell 1997).

As well as exploring meaning from the perspective of the workforce, through semi-structured interviews this study explored meaning from the perspective of management. Semi-structured interviews with managers extended the quantitative interactionist models to provide unique insight by investigating the basis of what it means to its members for an organisation to be creative and the priority accorded to it. Intuitively, shared meaning might contribute to the interactionist models as a moderating or an intervening, variable. In this way this investigation can be seen to combine conceptual similarities between Amabile's quantitative approach with the qualitative approach of Kanter (1988).

In addition, this investigation attempted to differentiate as far as possible between individual and group idea generation and implementation and between the processes of creativity (original ideas, personally deemed of value) and innovation (subjected to social validation for implementation) that potentially confound intrapersonal (psychological) and interpersonal (social and organisational) variables. The specific focus of this study was

creative processes from initial interest to decision to exploit (Kao 1989) but falling short of actual implementation which necessarily introduces further complexity in the form of the management of change. In this way, a greater understanding of how to stimulate, support and sustain organisational creativity has developed to inform managers in transforming rhetoric into reality.

1.5 Approach

Adopting a research strategy of multiple case studies, employing small to medium sized companies, comparisons fulfil the aims and objectives of this study. Research techniques including questionnaires, semi-structured interviews and archival data provided triangulation of results that supported development models, sufficiently complex yet parsimonious, to reliably inform the facilitation of creativity in organisations. As far as can be determined no previous studies have attempted such comparison.

1.6 Aims and Objectives

The main aim of this thesis was to undertake an investigation of the major components of the interactionist models of creativity, comprising individual, social and organisational factors, and to extend these to provide unique insight by investigating what it means to its members for an organisation to be creative. Ultimately, the aim was to develop a model to inform theory and practice for small and medium-sized companies in order that HRM and HRD professionals can effectively facilitate creativity. More specifically, the objectives of this investigation were:

- To undertake a research investigation of the major components of the interactionist models of creativity and innovation, comprising individual, social and organisational factors.
- To make comparisons based on multiple in-depth case studies of typical rather than critical cases and so more representative of a majority of companies.

- To differentiate between factors that support creativity (originality and value) and innovation (social validation and implementation) on the basis that the intrapersonal, psychological dimension of creativity is concerned with original idea generation, whilst validation depends on complex interpersonal, social and organisational factors that determine the successful exploitation of new ideas.
- To differentiate between individual and group creativity and innovation. The former represents an intrapersonal process and the latter a social, interpersonal process.
- To extend these factors by investigating what it means for an organisation to be creative and innovative on the basis that successful exploitation of new ideas has to overcome competing expectations of management, strategies and rationales in addition to institutionalised routines and inertia. Meaning relates directly to what is valued in the organisation.
- To develop a model of creativity and innovation to inform theory and practice.
- To explore implications for HRM and HRD in facilitating creativity and innovation.

In this way, this investigation aims to provide unique insight by:

- Adopting a systemic approach to the contribution of interactive components in supporting creativity, rather than partial interactions of sub-sets of specific elements.
- Differentiating between factors supportive of creativity and innovation (implementation).
- Differentiating between individual and group creativity and innovation (implementation).
- Exploring the interaction of elements of supportive climate and appropriate personality characteristics in contributing to organisational creativity

- Extending the components of the interactionist models to investigate the meaning of creativity in practice in individual organisations.

1.7 Research Questions

RQ1: Are individual and group creative idea generation and implementation positively associated with supportive climate and appropriate personality characteristics and is it necessary to differentiate?

RQ2: Do elements of creative organisational climate interact with appropriate personality characteristics in contributing to organisational creativity?

RQ3: Are relative contributions of psychological, social and organisational factors moderated by the meaning and value of creativity in the organisation?

1.8 Outline

Chapter 2 of this thesis provides a brief historical overview comparing and contrasting approaches and theoretical perspectives and evaluating research to date, leading towards the interactionist perspectives in the fields of creativity and innovation. Limitations of research to date are highlighted, in particular the investigation of specific elements of the interactionist models that illuminate only part of the overall picture and potentially lead to a fragmented body of evidence that does little to advance the understanding of creativity or to support theory that might reliably inform practice. The complexity of interactionist approaches demands a systemic approach more appropriate to interpretations of interactions between specific elements or combinations of elements and avoiding spurious relationships or confounding factors. The absence of systemic approaches based on the interactionist perspectives leaves open

the possibility of alternative explanations or relationships between various components. On the other hand, if systemic investigation is supportive the value of such models is reinforced through theoretical understanding that reliably informs practice. This chapter develops towards a summary of the research and research questions.

Chapter 3 details the research framework including sampling of companies and participants as well as data collection techniques. This includes a full account of stage one of this investigation and subsequent development to stage two, based on in-depth case studies of eight participating companies, mainly of small-to-medium size (8-150 staff) where the total population is approximately 600.

Chapter 4 represents a major section of the work in reporting data analysis and findings. Initial analysis is provided based on quantitative and qualitative data collected for each of the eight in-depth case studies of participating companies. Amalgamation of data from all companies allows analysis on the entire data set of 209 participants. Case-study comparisons lead to the development of a general linear model that accounts for 47 percent of the variance between participating companies. Finally, a qualitative comparison of companies on context specific factors explores additional variance in support for creativity and innovation.

Chapter 5 discusses the implications of the findings in relation to existing literature sources. Particular emphasis is on interactions between factors that support, extend or suggest alternative explanations resulting from the systemic approach adopted in this investigation compared to the limitations of fragmented, previous research. Findings explore value to the theoretical understanding and practical application of stimulating, supporting and sustaining organisational creativity and implications translated to HRM policies and practices.

Chapter 6 draws together the conclusions and implications of this investigation for the theory and practice of creativity and innovation in

business organisations and the significance of the supportive role of HRM policies and practices. The limitations of this investigation are highlighted with suggestions for future research.

Chapter 2: Theoretical Perspectives

The introduction to this investigation highlights the need for closure of the gap between rhetoric and practice in response to the creative revolutions of the 21st century. Fragmentation of research and its emergence from disparate disciplines has contributed to the current underdevelopment of theory to inform the facilitation of creativity in business organisations. Creativity, defined as the generation of original and useful ideas, has been researched almost exclusively from a psychological perspective, emphasising individual characteristics, cognitive and social processes as antecedents to creative outcomes. Innovation, defined as the exploitation of creative ideas, has been researched from sociological, economical or organisational studies perspectives, emphasising adoption and implementation processes within complex social settings, such as business organisations. This study adheres to stated definitions as far as possible.

The specific focus of this study is on creativity as the seed of innovation (Amabile, Coon et al. 1996) and the intention is to include those creative processes from initial interest to decision to exploit (Kao 1989) but falling short of actual implementation which necessarily introduces further complexity in the form of management of change and complexity. If an understanding of antecedents, processes and dynamic interactions is to be developed that might reliably inform the theory and practice of facilitating organisational creativity, an awareness of the contribution of various conceptual and research perspectives is necessary. Historical association with the exceptional talents, genius, achievements and eminence possessed by a subset of the population has given way to the view that all individuals have the potential to be creative to a greater or lesser degree depending, at least in part, on training and practice. Therefore, this chapter briefly examines historical perspectives,

summarised in Table 1, as they contribute to an understanding of more recent confluence of perspectives where potential exists for synergy between creativity and innovation research and which provide a major contribution to the current investigation.

Table 1 Theories of Creativity. (Adapted from Weisberg 2006:91)

Approach	Theory	Issues
Psychodynamic	Freud 1908	Unconscious conflicts; *Associative* unconscious
	Gestalt view	Leaps of insight Productive versus reproductive thinking Figure & ground
	Poincaré 1913	Unconscious *processing* Incubation and illumination
	Wallas 1926	Stages of creative thinking process
Psychometric	Guildford 1950	Testing creativity Divergent thinking
	Torrance 1974	Testing creativity: Fluency, Flexibility, Originality, Elaboration
Social-Personality	Barron & Harrington 1981	Personality
	Amabile 1983, 1996	Personality Intrinsic motivation
	Barrick & Mount 1991	Meta-analysis of Five Factor Model
Cognitive	Newell, Shaw & Simon 1962	Creative thinking and problem solving;
	Perkins 1982; Weisberg 1983, 2006	Expertise in creative thinking – more than problem solving Ordinary thinking in creativity
	Finke, Ward et al 1992	mental processes: retrieval, association, synthesis, analogical transfer
Pragmatic	Creative Problem Solving Osborne 1957 De Bono 1967, 1982, 1993 Van Gundy 1988	 Brainstorming Lateral thinking Techniques of structured problem solving
Confluence	Csikszentmihalyi 1988, 1996	Systems perspective
	Sternberg 1991	Investment theory
	Amabile 1983, 1996	Componential model
	Woodman et al 1993	Interactive approach

2.1 Brief history of creativity research

2.1.1 Psychodynamic approaches

Early psychodynamic approaches, (e.g. Freud 1908/1959) were based on the idea that creativity arises from tensions between conscious reality and unconscious drives and supported by cases studies of eminent creators, frequently artists, such as Leonardo da Vinci (Freud 1964). These were later extended to psychoanalytic approaches that introduced the primary process of adaptive regression, unmodulated thoughts that often occur in sleep, daydreams or intoxication; and the secondary process of elaboration, involving reworking and transformation (Kris 1952). Gestalt psychologists suggested creative ideas result from leaps of insight, a notion not unrelated to unconscious processing, when a new idea or new way of looking at a problem comes into consciousness. Wertheimer's (1982) reference to productive versus reproductive thinking also falls within this approach. Much of this work relates to current reference to 'right brain' engagement, incubation and sub-conscious association of previously unrelated phenomena.

In contrast with Freud's postulation of unconscious associations others proposed the role of unconscious processing, based in what is now known as parallel processing, where conscious processing represents only one stream (Poincaré 1913). This perspective highlights the roles of *illumination*, the sudden appearance in consciousness of a creative idea or solution that has not been the focus of conscious thought; and *incubation*, thinking about the problem unconsciously. A four-stage model of creative thinking, elaborates Poincaré's ideas (Wallas 1926): Once the problem is defined *preparation* involves exploration and formulating many possible solutions prior to critical analysis of the advantages and disadvantages. *Incubation*, defined above, is often useful at this stage leading to *illumination*, or insight, later subjected to *verification*, or evaluation. Although the psychodynamic approach fell out of favour both conceptually and methodologically with what was then an emerging scientific

psychology, Wallas's conceptualisation was subsequently refined and elaborated by many researchers (Patrick 1955; Gordon 1961; Parnes 1962; De Bono 1967; Parnes, Noller et al. 1971) and is considered to remain influential today (Weisberg 2006:94). Kao (1989) extends Wallas's (1926) four stages of the individual's creative process – *preparation*, *incubation*, *illumination*, *verification* - to include a preliminary *interest* stage where opportunities, problems and solutions are sought, not unrelated to motivation. A subsequent *exploitation* stage is where value is captured from the idea, resulting from social validation. This represents the start of the innovation process and emphasises the importance of preventing wastage of potentially valuable creative ideas.

2.1.2 Psychometric approaches

Since the time of Galton (1883) interest has been shown in creativity on the assumption that it has the potential to greatly influence human life (Albert 1983). Historically, the 'genius' view of creativity dominated the literature based on the assumption that the creative act involved extraordinary individuals carrying out extraordinary thought processes. Terman's (1925) longitudinal study specifically defined genius in terms of assessed intelligence and, while the contribution of intelligence was acknowledged by others it has been suggested that creativity is by no means equivalent to intelligence (e.g. Guildford 1950). More specifically Gardner (1993) suggests that creativity is psychologically distinct from intelligence once a threshold IQ of 120 is reached.

Unlike the psychodynamic perspective that focussed on the extraordinary processes and achievements of eminent individuals, which Guildford (1950) criticised as limiting research on creativity, the psychometric approach opened studies to everyday subjects using creativity tests, often based on divergent thinking. For example, the Torrance Tests of Creative Thinking (Torrance 1974) combine verbal and figural versions scored for fluency (number), flexibility (different categories), originality (rarity) and

elaboration. These dimensions have been criticised as trivial, inadequate measures (Sternberg 1986) that fail to capture the concept of creativity (Amabile 1983). Currently the measurement of creative outcomes remains highly problematic due to the complexity and subjectivity of the phenomenon.

Tests such as these failed to capture the need for expertise and intrinsic motivation. For example, if creativity is based on originality and usefulness, how appropriate are measures of divergent thinking, that encourage volume of ideas over usefulness or the extent to which these are valued. Much of the literature on creativity highlights the importance of domain-relevant knowledge, skills and experience. The relevance of research employing such tests to creative behaviour in real-life contexts is highly questionable for a number of reasons. It is highly likely that artificial contexts lack relevance or meaning and fail to motivate participants in the same way as actual real-life problems might in rich, meaningful, complex contexts. Further, this ignores the significance of expertise and motivation. The number of abstract ideas generated on demand at a single point in time under time constrained conditions bear very little resemblance to Wallas's or Poincaré's stages of the creative process. The intention is not detrimental to early theorists who have made major contributions to the field and, on the contrary, Torrance's subsequent contributions are highly influential, inspirational and motivational, '*Why Fly'* for example (Torrance 1995).

2.1.3 Social Personality Approaches

Much early interest adopted a differential perspective. A major focus of creativity research investigated personality characteristics and motivational variables as determinants of creativity. Personality may be linked to motivation through self-actualisation which, according to Maslow (1968) requires boldness, courage, freedom, spontaneity and self-acceptance, and which is considered to have a motivational force (Rogers 1954). Many researchers support the notion of individual differences in

motivational orientation (Hackman and Oldham 1980; Deci and Ryan 1985; Amabile, Hill et al. 1993) and, although volumes of research exist, theories remain very much work in progress. For example, considerable debate continues regarding the proposition of motivation as a more stable trait as well as a temporary state and it seems increasingly possible that both intrinsic and extrinsic motivation might be elicited as both; i.e. an individual, relatively stable trait but also a temporary state that affects most people in the social environment (Amabile 1993). Intrinsic motivation is seen to represent a major component in facilitating creative behaviour (Amabile 1983; Hennesey and Amabile 1988) and, more recently, it has been suggested that, under certain conditions, synergistic extrinsic motivation might contribute to creativity (Amabile 1996). Clearly, motivation remains centre stage in theoretical approaches to creativity, as will become apparent from the in-depth analysis of confluence approaches.

Use of laboratory settings and/or student samples in much early research on personality raises serious questions about reliability, validity, and generalisability to other contexts. On the basis that much of the literature on creativity highlights the importance of domain-relevant knowledge, skills and experience, how valid are student samples? However, the importance of personality characteristics to performance and creativity are well documented (e.g. Barron and Harrington 1981) and it is suggested that personality represents one of the more important influences on individuals' success or failure to develop new ideas or to translate ideas into action (Mumford and Gustafson 1988). Correlation studies and research contrasting high- and low-creativity samples at both eminent and everyday levels (Gough and Heilbrun 1965; Barron 1969; Gough 1979; Barron and Harrington 1981; Amabile 1983; Eysenck 1993) have identified a large set of potentially relevant traits.

Table 2. Five Factor Model traits and their empirical correlates

Factor	Abbreviation	Empirical Correlates (Scales and Items)
Neuroticism	N+	Anxious, defensive, emotional, guilt-prone, hypochondria, insecure, neurotic, tense, worrying
	N-	Achievement via conformance, adjusted, calm, ego-strength, good impression, guilt-free, happy, intellectual, efficiency, personal adjustment, stable, well-being
Extraversion	E+	Achieving, active, adventurous, ambitious, assertive, autonomous, dominant, energetic, enthusiastic, expressive, gregarious, impulsive, independent, leadership, power-oriented, self-assured, self-confident, sensation seeking,
	E-	Deferent, dependent, depressed, introverted, radical, reflective, reserved, social introversion, submissive
Openness	O+	Aesthetic, achievement via independence, change, creative, curious, flexible, humorous, imaginative, intelligent, open-minded, original, sensitive, sophisticated, wide interests
	O-	Conventional, inflexible, rigid, socialised
Agreeableness	A+	Affiliative, cooperative, easy-going, empathic, feminine, friendly generous, nurturing, peaceful, supportive, warm
	A-	Aggressive, argumentative, cynical, egotistical, exploitative, headstrong, hostile, masculine, suspicious
Conscientiousness	C+	Careful, cautious, controlled, endurance, fastidious, orderly, persevering, reliable, responsible, self-controlled
	C-	Direct expression of needs, psychopathic deviant
		Source: (Feist 1998)

Attempts have been made to compare measures of personality, such as the Myers Briggs Type Indicator (Clinebell and Stecher 2003; Furnham 2003; Moutafi, Furnham et al. 2003; Francis, Craig et al. 2007) and the Adjective Check List (Gough and Heilbrun 1965; Gough 1979; Carr 2006). One of the most used and, therefore, most influential is the Five-Factor Model of personality (Costa and McCrae 1985) that has been validated by organisational psychologists (Wiggins and Trapnell 1997) and is considered to feature individual differences important to workplace performance. There is evidence to support positive correlation between Gough's (1979) Creative Personality Scale and the *Openness* dimension

of the five-factor model (McCrae 1987; Piedmont, McCrae et al. 1991). The five factors are summarised in Table 2, and comprise *Extraversion*, *Conscientiousness*, *Emotional stability*, *Agreeableness* and *Openness to experience*, all of which have several sub-factors.

Based on Barrick and Mount's (1991) meta-analysis, the first dimension appears to be Eysenck's (1993) *extraversion*/introversion dimension, the characteristics of which include being outgoing, assertive, talkative and active. The second dimension would seem to be represented by the *Emotional stability*, emotionality or neuroticism, dimension, the negative pole of which includes, for example, being anxious, depressed or insecure. Greater disagreement is apparent for the *Conscientiousness* dimension, some suggesting that it reflects dependability, being careful, thorough and responsible, while others suggest that, in addition, this trait incorporates variables such as hardworking, achievement oriented (Digman 1990) and persevering. Barrick and Mount (1991) suggest that both *Conscientiousness* and *Emotional stability* are important to most jobs. *Conscientiousness* might contribute more specifically to innovation, in terms of perseverance and persistence. Traits associated with *Agreeableness* include being courteous, flexible, trusting and tolerant and are considered particularly important in management and sales positions where social interactions are crucial.

Based on this meta-analysis (ibid.), the fifth and final dimension, *Openness to experience*, refers to characteristics that include being imaginative, curious, cultured, original, broad minded and artistically sensitive, suggested as relating to training proficiency. Costa and McCrae (1985) emphasised different manifestations of this dimension depending on the focus of the experience. Weisberg (2006:509-10) defines these as:

- *Openness* to *fantasy* refers to a willingness to explore one's inner world and to let one's mind wander.

- *Openness* to *aesthetics* refers to an appreciation for artistic expression.
- *Openness* to *feelings* involves a willingness to accept one's emotions, both positive and negative.
- *Openness* to *actions* refers to willingness to try new activities.
- *Openness* to *ideas* is intellectual curiosity and willingness to consider new ideas.
- *Openness* to *values* refers to a willingness to examine the fundamental values on which one bases one's life.

Openness to experience is the dimension frequently associated with creativity and innovation (e.g. Feist 1998; 1999) and, therefore, calls for more detailed explanation and exploration. Extending the perspectives of Poincaré (1913) and Wallas (1926) many researchers suggest that creative individuals are able to make connections among ideas that less creative individuals do not (e.g. Feist 1993) possibly because of the ability to spread their attention more widely, facilitating sensitivity to a wider range of stimuli (Martindale 1989; 1995). It has been suggested that more open individuals are not only more flexible in absorbing information and combining new and unrelated information but also have a greater need to seek out unfamiliar situations that allow access to new experiences (McCrae and Costa 1997), hunger for knowledge creating valuable reserves on which their intellectual curiosity might draw. As more ideas or other stimuli simultaneously activate, greater potential exists for contact between previously unrelated ideas. This is important for creativity in two ways: firstly, a wide attention span raises awareness of problem opportunities and secondly, increases the potential for the generation of new ideas. Feist's (1999) comparisons of creative artists and scientists differentiates between social and non-social categories and provides further support for the *Openness* dimension, also suggesting personality characteristics that closely resemble other dimensions of the five-factor model (Costa and McCrae 1985; 1992).

Table 3 Summary of personality characteristics of artists and scientists

Trait category	Artists	Scientists
Non-social	*Openness to experience*	***Openness to experience***
	Fantasy oriented	**Flexibility of thought**
	Imagination	
	Impulsivity	
	Lack of *conscientiousness*	
	Anxiety	
	Affective illness	
	Emotional sensitivity	
	Drive	**Drive**
	Ambition	**Ambition**
		Achievement
Social	Norm doubting	**Autonomy**
	Nonconformity	**Introversion**
	Independence	**Independence**
	Hostility	**Dominance**
	Aloofness	**Arrogance**
	Unfriendliness	**Hostility**
	Lack of warmth	**Self-confidence**
		(Feist, 1999 in Weisberg, 2006)

For example, lack of *Conscientiousness* is likely to reflect the negative pole of the dimension with the same label. Anxiety and emotional sensitivity are similarly likely to reflect the negative pole of *Emotional stability* and hostility is likely to be similar to the negative pole of the *Agreeableness* dimension. Weisberg (2006:490) usefully summarises Feist's (1999) comparisons as shown in Table 3. Drive and ambition might resemble *Extraversion* and represent a part of the *Conscientiousness* dimension, although both interpretations appear contradictory, clearly suggesting differences. In a similar vein Csikszentmihalyi (1996) identifies ten pairs of contrasting traits that illustrate the complexity of personality for creative individuals, which is suggested as having many traits in common with Jung's (1946; 1968) mature personality. While conflicting traits are unlikely in any individual, opposite poles are suggested as necessary for generating ideas of value (creativity) and recognition of those ideas (implementation), leading this author to suggest that the 'creative' individual is someone who can successfully operate at both

polarities (Csikszentmihalyi 1996:76). Some examples of the creative relevance of opposite poles are shown in Table 4. Such complexity is critical to developing understanding of creative personality characteristics.

Table 4 Complexity of the creative personality (Csikszentmihalyi 1996)

Poles of traits	Behaviour	Creative relevance
Energy	Focussed energy; Under own control (rather than controlled by calendar, clock or external demands)	Pressure Intrinsic motivation
Inactivity	Reflection Recharging batteries	Unconscious processing; Incubation; Illumination
Intellect	Wisdom; IQ 120 Approximate cut off point for correlation with superior performance;	Sufficient knowledge and understanding of domain to generate original ideas
Naïveté	Curiosity	incentive to question
Playfulness	Fun	Enjoy exploring ideas
Discipline	Endurance, perseverance, responsibility	To see things through
Actual reality	Rooted sense of present	Novelty is rooted in reality
Emergent reality	Imagination, fantasy	Creative people are original rather than bizarre
Extraversion	Exchanging ideas	Exploring alternatives; extending knowledge base and experience available on which to draw; feedback, interaction
Introversion	Solitary genius	Focus on work
Humble	Selfless, Modest	"On the shoulders of giants"; Perspective
Proud	Ambitious, Arrogant, aggressive	Achievements
Masculinity	Tough, dominant, aggressive	Creative people tend towards psychological androgyny
Femininity	Sensitive, caring, nurturing	
Traditional	Conservative, conforming; Need to internalise domain-relevant knowledge and culture	Must learn rules of a domain in order to be creative
Rebellious	Independent; Willing to take risks	
Passion	Attachment, Energy, enthusiasm, involvement, Love for one's work	Without passion interest is lost.
Objectivity	Detachment , Impartiality, Credibility	Without objectivity, work might lack credibility and value
Enjoyment	*Openness*, sensitivity, Fun, excitement	Absorption in work; Flow
Suffering	Pain, anxiety	Rejection; Uncertainty; Persistence

There is some similarity to the relevance of hemispheric laterality to creativity, often referred to as 'right brain' activity. Left and right brain

processing often divides mental organisation into two parts, such as rational versus intuitive and analytical versus synthetic. It has been questioned whether these label truly distinct qualities or whether they describe extremes of a set of continuous behaviours (Springer and Deutsch 1993:273). Yet, not all language-related functions are in the left hemisphere and neither are all visio-spatial functions in the right hemisphere. For example, the right hemisphere appears to have some role in semantics and much to do with the contextual aspects of language (ibid.). This is supported by other authors who suggest that there is a gradient of relative hemispheric involvement in a wide range of cognitive processes, reflecting the degree of their routinisation (Goldberg and Costa 1981). Others differentiate between left, right, integrated or mixed information processing strategies. Integrated suggests an emphasis on left and right hemispheres simultaneously, implying a strong connections between the two. On the other hand, an individual using a mixed strategy will use left, integrated or right with no clear preference for one to the other. As such the mixed strategy is likely to be the most flexible as there is greater balance between the three responses (Taggart and Torrance 1984).

It is widely accepted that educational and occupational experiences result in favouring one mode of processing over the other, in the West left-brain processing has been traditionally developed and reinforced (Bogen 1969a; Bogen and Bogen 1969b; Doktor 1978). However, an increasing body of evidence suggests that specialised cognitive function interacts with job complexity and magnitude to predict performance (e.g. Gordon 1986; Gordon, Charns et al. 1987). According to Springer and Deutsch (1993:62) "it is not always possible to predict which hemisphere will control a response, despite instructions specifically designed to 'engage' one hemisphere" leading to the suggestion that there is a delicate balance between the hemispheres with one or the other taking over, depending on the task and other as yet unspecified factors. Therefore, the popular use

of terms 'left' or 'right' brain thinking or processing are metaphorical rather than grounded in science.

In making a distinction between the aforementioned trait approaches and personality styles, the discussion returns to the influential Myers-Briggs Type Indicator (MBTI) (e.g. Myers 1962; 2000). Deriving from the work of Jung (1946; 1968) the MBTI is based on four distinctions: *Extroversion (E)*, outgoing with an interest in people and the environment, versus *Introversion (I*), more inwardly focussed. *Intuitive (N)*, perceive stimuli holistically and concentrate on meaning rather than details, versus *Sensing (S),* perceiving information realistically and precisely. *Thinking (T),* logical, analytical and impersonal judgement*,* versus *Feeling (F)*, oriented towards values and emotions in their judgements. *Perceptive (P),* dependent on information, versus *Judging (J),* interpret information. Each of the 16 possible combinations produces a different overall additive personality type, as suggested by the tool's title, and this highlights the need to recognise that people have profiles or patterns of styles rather than just a single type. Evidence exists to suggest relationships between the MBTI and the Five-Factor Model of personality. Significant correlations have been demonstrated for *Extraversion* with EI; *Openness* with SN, *Agreeableness* with TF and *Conscientiousness* with JP (McCrae and Costa 1989). No relationships were evident for *Emotional stability* (Neuroticism).

While the contradictory polarities suggested by Csikszentmihalyi (1988; 1991; 1996; 1999) present huge potential for valuable insights, the author downplays the influence of personality - and creative problem solving training. Personality represents one of the major factors identified by confluence models as contributing to creativity and interacting with other factors. The social-personality approach highlights the contribution of potentially critical factors to the facilitation of creativity, although work from this perspective has tended to be downplayed at the expense of

subsequent development of social-contextual approaches, mental representations and cognitive processes (Sternberg and Lubart 1999), which are discussed in the following section.

2.1.4 Cognitive approaches

The view that creativity is an intellectual process requiring a great deal of cognitive effort (Simon 1985) using ordinary thought processes (Weisberg 1986; 1993; 2006) clearly begins to emphasise the importance of perspiration versus inspiration, and persistence often referred to as essential to the creative process. Cognitive approaches have investigated mental representations and processes underlying creative thought (Sternberg and Lubart 1999) which might be exemplified by work that suggests creativity involves the mental processes of retrieval, association, synthesis, transformation, analogical transfer and categorical reduction (Finke, Ward et al. 1992). Others similarly suggest that creative insights depend on subjects using conventional cognitive processes, such as analogical transfer, applied to knowledge already stored in memory (Weisberg 1986; 1993; 2006). These perspectives emphasise the importance of the level of knowledge, and experience on which to draw in attempting (consciously or subconsciously) to associate diverse, previously unrelated information or concepts.

Creative problem solving involves search through large spaces of possibilities where individuals are actually attempting to reach new knowledge states (Shalley 1991). However, problem-solving tasks typical of this approach comprise puzzles that have a limited number of possible solutions and might bear little resemblance to the complexity of real-life problems demanding creative solutions. For example, real-life factors have been shown to inhibit analogical transfer between isomorphs of the classic Tower of Hanoi problem (Kotovsky, Hayes et al. 1985). The cognitive activities that are necessary in order to be creative include problem definition, environmental scanning, data gathering, unconscious mental activity on the problem, insight to the problem solution, evaluation

of alternatives and implementation (Simon 1966; Crosby 1968; Hogarth 1980). Many of these approaches have used heuristic problem-solving tasks and are compatible with approaches to problem-solving, and creative problem solving, closely resembling, while not identical to, Wallas's (1926) steps in the creative process comprising *preparation*, *incubation*, *illumination* and *verification*, with the notable exception of *incubation* that seems to be downplayed both theoretically and practically.

As suggested by Sternberg and Lubart (1999), at best, cognitive approaches tend to downplay the personality and social system, while social-personality approaches pay scant attention to cognitive approaches. An exception to this is, perhaps, that of cognition-centred *styles* that emerged in the 1950s and 1960s in an attempt to account for variation in performance that cannot be explained by ability alone (Sternberg 1997), reflecting preferences in the use of abilities. The Stenberg Wagner self-assessment inventories on thinking styles (SWSAITS) comprise a number of inventories based on individual thinking styles (ibid.). For example, successful entrepreneurs might succeed precisely because they are *legislative*, people who like to do things their own way, prefer problems that are not prestructured, prefer creative and constructive activities, such as designing projects and creating new business. The *executive* style is typical of implementers, people who prefer more structured problems and thrive on getting things done within the given structure. *Judicial* people like to analyse and evaluate. As Sternberg (ibid: 40) suggests,

> "An organisation without *legislative* people would end up copying other organisations, and thereby always be running behind. An organisation without *executive* people might have many plans that they never implement. An organisation without *judicial* people would be unsuccessful at evaluating which of its policies and plans were working and which were not".

Cognitive style bridges the study of cognition and personality that might belong in either or both approaches. Thinking style is assumed to change with experience and could be accommodated under social-personality approaches.

In contrast to the perspective that creativity involves extraordinary processes, Weisberg proposes that creative thinking is simply ordinary thinking that has produced an extraordinary outcome (Weisberg 1986; VanGundy 1988; 1993; Weisberg 2006). In an organisational context, it remains impractical and unethical to manipulate variables for the purposes of experimentation and analysis of cognition in creative thinking. However, the contribution of the cognitive perspectives remains predominant in pragmatic approaches to creativity and innovation in the form of creative problem solving programmes and techniques.

2.1.4.1 *Pragmatic approaches*

The availability and take-up of creativity training programmes might equally be regarded as part of the cognitive, social-personality or socio-cultural influence, providing they are robust and build on cognitive problem solving perspectives. For example, cognitive modelling techniques have been found to increase originality and numbers of creative responses (Harris and Evans 1974; Gist 1989). Others have been criticised as pragmatic approaches to the commercialisation of creativity by those primarily interested in developing creativity and only secondarily to understanding it and almost not at all testing the validity of their ideas about it (Sternberg and Lubart 1999). However, this is, of course, entirely dependent upon the type and relevance of training, the trainer's professionalism, and their understanding of the processes of creativity and innovation.

Training programmes may be based around the familiar yet misunderstood and frequently misused technique of brainstorming (Osborn 1957), the abuse and overuse of which detracts from its value as a creative problem

solving technique. For example, the use of the term is now commonplace yet rarely do sessions follow Osborn's procedures, particularly the need for delayed evaluation. However, the distinction between brainstorming and creative problem solving is an important one. Brainstorming is a technique incorporated into the creative problem solving process, specifically designed to enhance divergent thinking in groups. There are similarities in developments of Osborn's work (e.g. Noller, Parnes et al. 1976; Isaksen and Treffinger 1985; 2004). The process of creative problem solving typically comprises: *problem definition, idea generation, transforming ideas into solutions* and *constructing action plans*, dependent on a dynamic balance between divergent and convergent thinking (Puccio, Firestien et al. 2006). Other programmes might be based around De Bono's well known and misunderstood, concept of lateral thinking (De Bono 1967; 1982; 1993); Gordon's (Gordon 1961) synectics, or Van Grundy's (1988) influential techniques of structured problem solving. Reference to lateral thinking is commonplace yet relatively few are trained facilitators of such techniques.

Unfortunately, many approaches to creative problem solving are only loosely based on a scientific understanding, focussing greater concern on pragmatic commercialisation that is potentially damaging to the understanding of creativity (Sternberg 1999). Published evidence of the benefits of training in creative problem solving remain relatively rare possibly due to difficulties associated with making direct links to outcomes in complex organisational contexts or possibly because of factors such as confidentiality, sensitivity or an unwillingness to share success. At a group level there is some evidence that groups trained in creative problem solving significantly outperform untrained groups in terms of the number and quality of ideas generated (Firestien and McCowan 1988; Firestien 1990). Recent years have witnessed the publication of a number of reviews or meta-analyses that provide some evidence of the positive impact of the more scientific approaches to creative problem solving

(Basadur 1993; Vehar 1994; Balestra 1997; Isaksen and Treffinger 2004; Scott, Leritz et al. 2004a; 2004b; Puccio, Firestien et al. 2006). Balestra's (1997) review located forty studies, including Basadur and Vehar among others, specifically focussing on the Osborn-Parnes model. Analysis identifies 190 benefits of which 46 percent relate to organisational processes, particularly decision making and team functioning, and 36 percent relate to individual behaviours, thinking skills and competence. Based on Kaplan and Norton's framework (2004) 73 percent of benefits could be classified under learning and growth, comprising human and organisational capital, the latter including culture (12 percent of total benefits).

This is supported by a further recent UK evaluation of the contribution of three different creativity training programmes to employees' idea generation and implementation which suggested that trainees reported stronger motivation and significant increases in both idea generation and, although weaker, idea implementation (Birdi 2003). The amount of training, motivation and grade were all significantly associated with generation of ideas. However, implementation of ideas appeared not to be associated with creativity training. Environmental factors of management support and divisional climate appeared more strongly related to implementation. Whilst creativity training may enhance the generation of ideas, if the work environment is not supportive then few of these ideas will transfer into organisational innovations. This adds further support to the rationale for the current investigation in attempting to differentiate between creativity and innovation processes.

To the extent that training programmes actually affect cognitive skills and styles, then creativity training has a potential link to these variables and organisational conditions will only be effective to the extent that members know of and prefer these conditions (Woodman, Sawyer et al. 1993). For the benefits of training in techniques of structured problem solving (e.g. De

Bono 1967; 1982; VanGundy 1988; De Bono 1993) to successfully transfer to the workplace so that creativity might be enhanced and sustained, integration with other major factors is critical. Increased awareness and understanding of these important issues is critical to assisting organisations in effectively translating rhetoric into sustainable practice.

To summarise the argument to this point, psychodynamic approaches contribute to the understanding of creativity through raising awareness of unconscious processes and stages of the creative thinking process (Poincaré 1913; Wallas, 1926). Cognitive perspectives highlight creativity as involving ordinary rather than extraordinary processes (Perkins, 1981; Weisberg, 1993, 2006). The social-personality perspective highlights the contribution of creativity relevant characteristics and pragmatic approaches emphasise training in creative thinking techniques. Early research that focussed on individual characteristics such as cognitive processes, personality and motivation as determinants of creative behaviour has extended to include social and contextual factors. This takes into account the realisation that creativity does not occur in a vacuum but is largely dependent on historical and personal antecedents and influenced by continuity and identification of discontinuity (Weisberg 1993; 2006) in social and environmental factors. This clearly highlights the importance of micro and macro environmental characteristics, developments that have been critical, as creativity within an organisation is not simply individual creativity that manifests through work.

2.1.5 Confluence approaches

Recognising that individual approaches to creativity often neglect the cyclical relationship between the individual and the environment that can result in individuals' modification of external conditions to increase creativity, many researchers began to examine creativity from a systems-oriented, holistic rather than atomistic, perspective (Williams and Yang 1999). An organisation is, by definition, a system, and systems

approaches are critical in understanding organisational creativity. Confluence approaches emphasise the interaction between individual and environmental components. For example, an individual might display characteristics of a creative personality and possess the necessary skills and techniques to generate new ideas and solve problems creatively. However, not only may an individual's potential for creative behaviour all too easily be overshadowed by an unsupportive environment, but challenges arise in dealing with co-workers and superiors, who may not support the idea or who may wish to steal or suppress it for nefarious reasons (ibid.). In order for creative potential to be realised at work the individual must not only be able to behave creatively but must also want to (Hunt 1995). For a creative idea to translate into innovative practice depends on prior communication and acceptance.

Potential barriers to the generation and implementation of creative ideas within the organisational setting may include strategy, structure, culture, climate, and status. For example, organisational environments may nurture established patterns of thinking that reject or inhibit creativity, innovation and change (Kanter 1988; Ford 1996). Clearly within the organisational setting potential barriers and facilitators operate at the individual, group and organisational levels. As suggested by Sternberg and Lubart (1999), recent works on creativity hypothesize that multiple components at each of these levels must converge for creativity to occur (e.g. Perkins 1981; Amabile 1983; Sternberg 1985a; 1985b; Csikszentmihalyi 1988; Mumford and Gustafson 1988; Gruber 1989; Sternberg and Lubart 1991; Gardner 1993; Weisberg 1993; Woodman, Sawyer et al. 1993; Lubart and Sternberg 1995; Amabile 1996; Sternberg and Lubart 1996). Four such approaches were of significance to the present work in progress since 2004. It is interesting to note that the DTI Report (DTI 2005) and the Cox Review (Cox 2005) published in the intervening period also highlight two of the models that have been central to this investigation (Woodman, Sawyer et al. 1993; Amabile 1996;

Amabile, Burnside et al. 1999) from the start. This serves to reinforce the significance and timeliness of this contribution.

2.1.5.1 *Csikszentmihalyi's (1988, 1996) Systems Approach*

Perhaps the most important implication of the systems model is that the frequency and level of creativity in a given place at a given time does not depend only on the amount of individual creativity. As Csikszentmihalyi (1996:1) suggests, "An idea or a product that deserves the label 'creative' arises from the synergy of many sources and not only from the mind of a single person".

Csikszentmihalyi (1988; 1996; 1999) highlights the interaction of the individual, domain and field. Therefore, it depends just as much on how well suited the respective domains and fields are to the recognition and diffusion of novel ideas. This can make a great deal of practical difference to efforts for enhancing creativity. Today many American corporations spend a great deal of money and time trying to increase the originality of their employees, hoping thereby to get a competitive edge in the marketplace. But such programmes make no difference in an unsupportive organisational system unless management also learns to recognise the valuable ideas among the many novel ones, and then find ways of implementing them (Csikszentmihalyi 1996:31). This author further suggests, "It is easier to enhance creativity by changing conditions in the environment than by trying to make people think more creatively*."* (ibid: 1). The perspective taken here is that the combination of ongoing training in creative problem solving techniques and a climate that is supportive of creativity are both necessary but independently insufficient.

According to Csikszentmihalyi's model (ibid) creativity depends on the interrelations of the system, comprised of the domain, the field and the individual. The domain refers to the scope of a subject or area of interest and influence, as defined by values and symbols of culture and shaped by society. For most people, domains are primarily ways to make a living,

based on ability and openings. However, many individuals choose domains because of a powerful calling to something they greatly enjoy and so that acting within the rules of the domain are rewarding in itself. Creative individuals are frequently found within the latter group, where most would continue their contribution in the absence of financial reward. Intrinsic motivation resulting from such engagement, immersion, absorption, passion or love for one's work might be perceived as beyond the control of management, yet are central to human resource management. The field represents gatekeepers to the domain who determine what is recognised and preserved into the system.

Creative ideas, therefore, depend on an individual's knowledge of a domain and social validation by the field. The individual creating the idea is not necessarily different from anyone else. Creativity is seen to result from perspiration, perseverance and persistence rather than sudden insight. Creativity is often referred to as engaging hearts and minds and from this perspective, it is useful to draw on Csikszentmihalyi's (1996:48-50) reference to the *'Flow'* of creativity. Based on the need of the person who wants to make a creative contribution to internalise the system, this author provides an illustration of the importance of the domain, person and field. A lucid example is provided (ibid.) of the engineer and serial inventor Jacob Rabinow (1910-1999). Among more than 200 of his inventions were automated scanning and sorting machines used by the Post Office and major banks.

Domain: "So you need three things to be an original thinker. First you need to have a tremendous amount of information – a big database if you like to be fancy. If you're a musician, you should know a lot about music, that is, you've heard music, you remember music, you could repeat a song if you have to. In other words, if you were born on a desert island and never heard music, you're not likely to be a Beethoven. You might, but it's not likely. You may imitate birds but you're not going to write the Fifth Symphony. So you're brought up in an atmosphere where you store a lot of information.

So you have to have the kind of memory that you need for the kind of things you want to do. And you do those things which are hard, so you get better and better by doing the things you do well, and eventually you become either a great tennis player or a good inventor or whatever, because you tend to do those things which you do well and the more you do the easier it gets, and the easier it gets, the better you do it, and eventually you become very one-sided but you're very good at it and you're lousy at everything else because you don't do it well. This is what engineers call positive feedback. So the small differences at the beginning of life become enormous differences by the time you've done if for forty, fifty, eighty years as I've done it. So anyway, first you have to have the big database." [KNOWLEDGE, ABILITY, EXPERTISE]

Person: "Then you have to be willing to pull the ideas, because you are interested. Now some people could do it, but they don't bother. They're interested in doing something else. So if you ask them they'll, as a favour to you, say: 'Yeah, I can think of something.' But there are people like myself who *like* to do it. It's fun to come up with an idea, and if nobody wants it, I don't give a damn. It's just fun to come up with something strange and different." [CURIOSITY, MOTIVATION, FUN, PASSION]

Field: "And then you must have the ability to get rid of the trash which you think of. You cannot think only of good ideas, or write only beautiful music. You must think of a lot of music, a lot of ideas, a lot of poetry, a lot of whatever. And, if you're good, you must be able to throw out the junk immediately without even saying it. In other words, you may get many ideas appearing and you discard them because you're well trained and you say, 'that's junk'. And when you see the good one, you say, 'Oops, this sounds interesting. Let me pursue that a little further.' And you start developing it. Now people don't like this explanation. They say, 'What? You think of junk?' I say, 'Yup. You must'. You cannot a priori think only of good ideas. You cannot think only of great symphonies. Some people do it very rapidly. And this is a matter of training. And, by the way, if you're not well trained but you've got ideas, and you don't know if they're good or bad, then you send them to the Bureau of Standards, National Institute of Standards, where I work and *we* evaluate them. And *we* throw them out." [OPPORTUNITY, CREATIVE THINKING SKILLS, DIVERGENCE, ORIGINALITY, RELEVANCE, VALUE, CONVERGENCE]

Asked what constitutes 'junk', i.e. not valued:

"It doesn't work, or it's old, or you know that it will not gel. You suddenly realise it's not good. It's too complicated. It's not what mathematicians call 'elegant'. You know, it's not good poetry. And this is a matter of training. If you're well trained in technology you see an idea and say, 'Oh God, this is terrible.' First of all, it's too complicated. Secondly it's been tried before. Thirdly, he could have done it in three different easier ways. In other words, you can evaluate the thing. This doesn't mean that he wasn't original. But he simply didn't do enough. If he were well trained, if he had the experience I had, and had good bosses and worked with great people, he could say this is not really a good idea."

From this the influences of passion, of both heart and mind, emerge as the well as the courage to find the 'wings' to fly (Torrance 1995). In the author's own words,

> "Creativity occurs when a person, using the symbols of a given domain such as music, engineering, business or mathematics, has a new idea or sees a new pattern, and when this novelty is selected by the appropriate field for inclusion into the relevant domain. The next generation will encounter that novelty as part of the domain they are exposed to, and if they are creative, they in turn will change it further." (Csikszentmihalyi 1996:28).

2.1.5.2 *Sternberg and Lubart's (1991) Investment Theory*

Based on a metaphor of successful economic stock market trading, Sternberg and Lubart's (1991 ,1995,1996; 1992; Lubart and Sternberg 1995) investment theory suggests that creative individuals are willing and able to 'buy low and sell high' in the realm of ideas. This is in direct contrast to the 'creative' or 'innovative' (both terms are used deliberately to highlight their perceived confusion and interchangeable use) emulation of ideas. For example, 'buying low' reiterates that while the creative individual values the idea, the creative ideas are usually not valued highly by others, at least initially. Success, therefore, depends upon persistently persuading others of the value of the idea in order to 'sell high'.

Sternberg and Lubart's (1995) suggestion that in addition to originality and value, the definition of creativity needs to be extended to include high quality and importance is critical, in adding to the perceived creativity and, of course, to successful exploitation. Sternberg and Lubart (1995) suggest that investment theory necessitates a confluence of six distinct but interrelated resources, summarised in Table 5. Support for the investment model (Sternberg and Lubart 1991; 1992; 1995; 1996) has been provided through research on tasks including devising creative advertisements for

boring products and solving unusual scientific problems (Lubart and Sternberg 1995).

Table 5 Investment model (Sternberg and Lubart 1991; 1992 1995; 1996)

Intellectual abilities	• *Synthetic* ability to see problems in new ways and to escape the bounds of conventional thinking • *Analytic* ability to recognise which ideas are worth pursuing • *Practical-contextual* ability to know how to persuade others of the value of one's ideas
Knowledge	• Sufficient to move forward Vs. • Closed perspective
Styles of thinking	• Novel thinking of one's own choice • Thinking well and along new lines • Globally and locally
Personality	Important. We all have the potential to increase our creativity, to a degree (implies some are more creative)
Motivation	Essential
Environment	Supporting and rewarding

In common with other confluence theories and models, the investment theory hypothesises to involve more than a simple sum of the individual's attained level of functioning on each component. According to Sternberg and Lubart (1999) there may be thresholds for some components (e.g. knowledge) below which creativity is not possible regardless of the levels attained on other components. Partial compensation may occur in which a strength on one component (e.g. motivation) counteracts a weakness in another component (e.g. environment) and interactions may occur between components (e.g. intelligence and motivation) in which high levels on both could multiplicatively enhance creativity. Confluence of intellectual abilities is particularly important in this theory, as analytical ability alone would lead to powerful critique but not creativity, synthesis alone results in new ideas that are not scrutinised for evaluation and practical application, and practical-contextual ability alone may result in transmittal of ideas not because they are good but because of powerful presentation. This represents a more instrumental, utilitarian approach although not without elements of heart and mind, whilst also recognising the need for balance

not dissimilar to Csikszentmihalyi's (1996) suggested necessity to operate at both polarities of the creative personality dimensions.

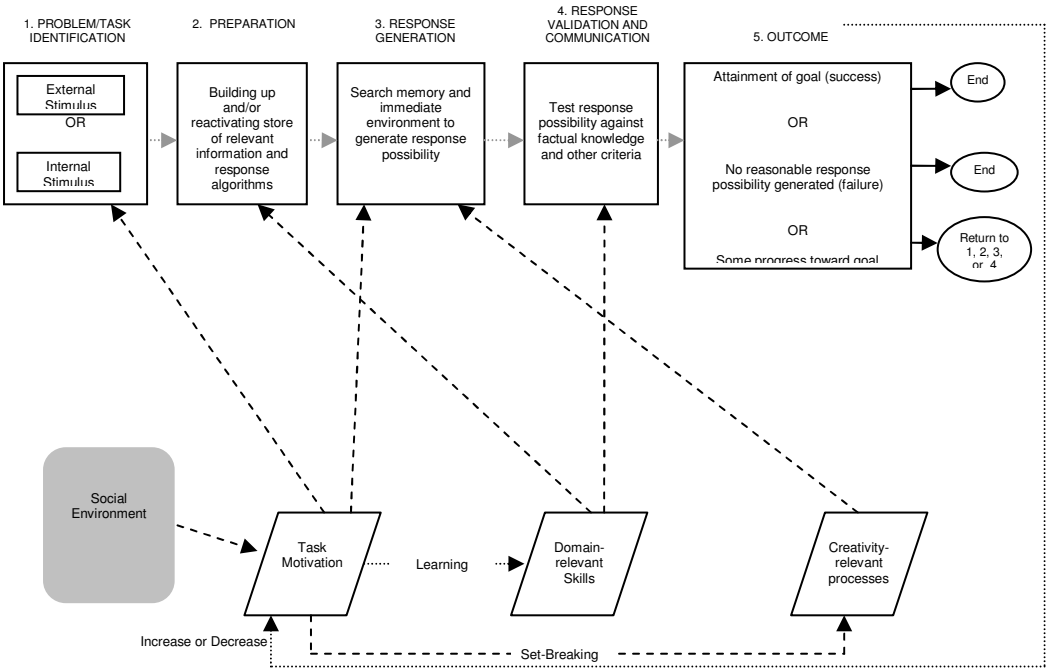
2.1.5.3 *Amabile's (1983; 1996) Componential Model of Creativity*

> "Creativity is the seed of all innovation, and psychological perceptions of innovation (the implementation of people's ideas) within an organisation are likely to impact the motivation to generate new ideas", (Amabile, Coon et al. 1996:1155).

Amabile's componential model (1983), subsequently revised, describes creativity as the confluence of intrinsic motivation, domain-relevant knowledge and abilities and creativity-relevant processes that might positively or negatively be influenced by the social environment (Amabile 1996). The model, builds on the historical development of creativity and innovation research outlined in the early sections of this chapter through recognition of unconscious thought and stages of the process arising from the psychodynamic perspective, social and personality and cognitive perspectives.

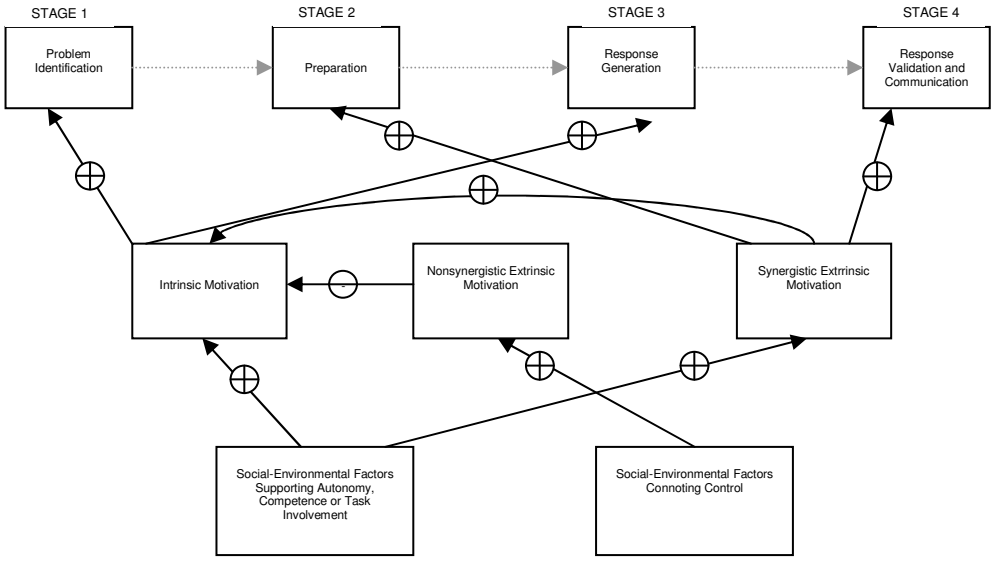
For example, steps 2-4 as shown in Figures 2-1 and 2-2 closely resemble the four stage process emerging from the work of Poincaré (1913) and Wallas (1926). *Preparation* (step 2) involves exploration and formulating many possible solutions (step 3), *incubation* is often useful here leading to *illumination*, prior to critical analysis of the advantages and disadvantages, or *verification* (step 4). Amabile's model also demonstrates Kao's (1989) extension of Wallas's (1926) work through the inclusion of a preliminary *interest* stage where opportunities, problems and solutions are sought (step 1) and a subsequent *exploitation* stage where value is captured from the idea, representing the start of the innovation process (step 5).

Figure 2-1 Revision of the componential model of creativity.



Broken lines indicate the influence of particular factors on others. Grey lines indicate the steps in the process (where large variations in the sequence are possible). Only direct and primary influences are depicted. (Amabile, 1996: 113).

Figure 2-2 Componential model: Mechanisms of social-environmental influence on creativity



Only direct and primary influences are depicted. (Amabile, 1996: 119)

Breaking down the components of confluence approaches based on the interaction of personal and contextual factors clearly reveals evidence of having developed from most or all theoretical approaches adapted from Weisberg's (2006) summary outlined in Table 1. Broadly, psychodynamic approaches such as Wallas's stages of the creative thinking process (1926) have been influential in the development of cognitive approaches and were likely to have had a major contribution to the more robust pragmatic approaches to stages of the creative thinking process, for example Osborn-Parnes, De Bono and Van Gundy. Divergent thinking is an important part of most techniques. Social-personality approaches provide a major contribution in extending earlier approaches to explore individual and contextual characteristics. Confluence perspectives explore the complexities of such interactions.

The real value of Amabile's (1983; 1996) model is the emphasis on motivation and the social environment, on the basis that the latter is crucial to the former. Intrinsic motivation in particular has a direct influence on creativity relevant processes that are thought to enhance individual creativity regardless of domain (Amabile 1983), and dependent upon, for example, cognitive style, heuristics and personality. Amabile appears to be suggesting that domain relevant knowledge is important but that creative thinking skills, comparable to intellectual abilities, thinking styles and personality in Sternberg's investment model, in any domain are dependent on motivation. It is further suggested that creativity may not only require motivation but also generate it (Amabile 1996; Birdi 2003), something that is important to Amabile's (1996) revisions to her original (1983) model, which excluded social environmental influences and the potential of motivational synergy (1993) of some types of extrinsic motivation with intrinsic motivation. Of course, this is critical to the contribution of creativity and innovation in sustaining competitive advantage. The influence of the social environment on motivation, domain-relevant knowledge and abilities and creativity relevant processes, and the contribution of these three components to the creativity processes are

apparent from Figure 2-1. Each component is necessary but, on its own, insufficient. It is the contribution and interaction of all components deemed necessary. For example, in the absence of intrinsic motivation if an individual engages in the task at all, creativity is likely to be low, regardless of domain relevant knowledge or creativity relevant processes. On the other hand, intrinsic motivation and domain relevant knowledge in the absence of creativity relevant processes is likely to lead to potentially appropriate outcomes that lack originality. Finally, motivation and creativity relevant processes, where domain relevant knowledge is lacking, are likely to result in original but inappropriate outcomes.

However, it is important to remember that this model indicates direct and primary influences and, for example, the contribution of motivation is indicated only for problem identification (step 1) and response generation (step 3). Motivation will also influence the *preparation* and *implementation* stages. Figure 2-2 provides more detail of the complexity of the influence of the social environment on intrinsic, non-synergistic and synergistic extrinsic motivation and the influence of these drives on steps in the creativity process. Unlike many organisational theories of job satisfaction that suggest the two main forms are additive (Vroom 1964; Porter and Lawler 1968), Amabile's original intrinsic motivation hypothesis suggested intrinsic motivation is conducive to creativity whereas extrinsic motivation is detrimental to creativity (Amabile 1983). Influenced at least in part by the proposition of Cognitive Evaluation Theory that extrinsic motivation can be perceived as informational rather than controlling (Deci and Ryan 1985) depending on perceived salience of contextual factors. Contextual constraints on individual behaviour are controlling and likely to reduce intrinsic motivation, whereas support, encouragement and constructive feedback are likely to increase intrinsic motivation.

Intrinsic motivation, where the task is an end in itself, becomes defined as "any motivation that arises from the individual's positive reaction to qualities of the task itself; this reaction can be experienced as interest,

involvement, curiosity, satisfaction or positive challenge". Extrinsic motivation, on the other hand, represents a means to an end, arising from sources outside of the task itself, including expected evaluation, contracted-for reward or similar (Amabile 1996:115). However, it is possible to differentiate between synergistic motivation that is supportive of creativity particularly when intrinsic motivation is high, and non-synergistic motivation that undermines creativity. Synergistic motivators include reward and recognition for creative ideas, clear overall project goals and constructive feedback; factors that have been shown to undermine creativity include win-lose competition, expert evaluation, tangible rewards and control (Amabile and Gryskiewicz 1987; Amabile, Coon et al. 1996). Rewards feature in both categories and it is important to differentiate between rewards that combine positively with intrinsic motivation and those that undermine creativity. Rewards that confirm competence without connoting control, or rewards that enable exciting work can serve as synergistic motivators supportive of intrinsic motivators. Further, synergistic extrinsic motivators are likely to be particularly appropriate at those stages of the creative process calling for endurance, persistence, perseverance and persuasion (Figure 2-2 steps 2 and 4). Intrinsic motivation is more important at stages 1 and 3 of the process where originality is called for, which supports the suggestion that cognitive flexibility and complexity are highest where intrinsic motivation is strong (McGraw 1978). The multiplicative interaction of components is complex and remains underdeveloped.

Differentiating between stages of the creativity process is important. The discussion on personality has drawn attention to the contradictions of Feist (1999) and Csikszentmihalyi (1996) as well as dimensions of the five-factor model that might be more supportive of creativity or innovation. As shown in Figure 2-2, a social environment that supports autonomy, competence and task involvement can be conducive to creativity through the enhancement of intrinsic and synergistic extrinsic motivation; but a social environment that is perceived as controlling will lead to non-

synergistic extrinsic motivation that detracts from intrinsic motivation (Amabile 1996:118-9).

Some of the implications for increasing creativity arising from this discussion of intrinsic and synergistic (vs. non-synergistic) extrinsic motivation include the informational value of developmental feedback, the design of reward and recognition systems to inform about competence and development rather than emphasising negative evaluation. Simply, this could be raising awareness in ways that are useful, meaningful and empowering rather than in ways that are perceived as controlling. Considerable overlap exists between Amabile's model and Sternberg and Lubart's investment model. However, there are essential differences; firstly Sternberg's model includes the environment at the same level as other factors, whereas Amabile's model proposes that only intraindividual components, each of which is influenced by the environment and primarily motivation, directly influence the creative process. The second essential difference concerns domain specificity that already forms a part of the foregoing discussion.

Table 6 usefully summarises the components of Amabile's model in addition to detailing positive and negative influence of social environmental factors and their effect on intrinsic and synergistic motivation. Many of these influences, for example, effects of evaluation, reward and task constraint, social facilitation, modelling and motivational orientations, have been empirically supported (See Amabile, 1996:131-242). According to Amabile, intrinsic task motivation, domain-relevant skills and creativity-relevant processes interact multiplicatively. For example, a high level of creativity-relevant skills with low intrinsic motivation is likely to result in only moderate creative outcomes, if the person engages in the task. Similarly, high intrinsic motivation but low creativity-relevant skills are likely to produce moderate creativity. In the first example, a more supportive organisational climate might enhance intrinsic motivation. In the

Table 6 Summary of Components for Amabile's (1983; 1996) model

Domain-relevant skills	● Knowledge about the domain ● Technical skills ● Domain-relevant 'talent' Depends on: - innate cognitive abilities - formal and informal education	
Creativity-relevant processes	● Appropriate cognitive style ● Implicit or explicit knowledge of heuristics for generating novel ideas ● Conducive work style Depends on: - training and experience in idea generation - personality characteristics	
Task Motivation	● Attitudes towards the task ● Perceptions of own motivation for undertaking the task Depends on: - intrinsic motivation - synergistic extrinsic motivation (1996) - presence/absence of salient extrinsic constraints - ability to cognitively minimise extrinsic constraints	
Social Environmental (1996:120)	*Positive*	*Negative*
General	*Autonomy/sense of control *Sufficient Resources* *Importance/urgency in work *Optimal challenge Recognition/reward that confirms competence Reward that enables intrinsically interesting work *Task matched to interests Sufficient task structure to support competent performance	Threatening critical evaluation connoting incompetence Expectation of critical evaluation Surveillance Contracted-for reward connoting Restricted choice/constraint Control Arbitrary/unrealistic deadlines Competition with co-workers
Organisational	Recognition that failure in work can provide valuable information *Mechanisms for considering new ideas *High-level encouragement toward innovation *Immediate supervisor encouragement Co-worker skill diversity Co-worker *openness* to new ideas Rigid status structures Co-workers challenge ideas constructively *Emphasis on intrinsic motivators Competition with outside organisations Constructive work-focussed feedback Clear strategic direction, with procedural autonomy Cooperation Collaboration	Lack of communication Lack of cooperation Emphasis on the status quo Emphasis on extrinsic motivators Win-lose competition within the organisation Rigid procedures Apathy toward project from others in organisation
* Direct impact on intrinsic motivation. Other positive influences likely to serve as synergistic extrinsic motivators. Influences described are general; these factors can interact with other variables and with individual traits and skills. Some effects may be non-linear, especially at the extremes.		

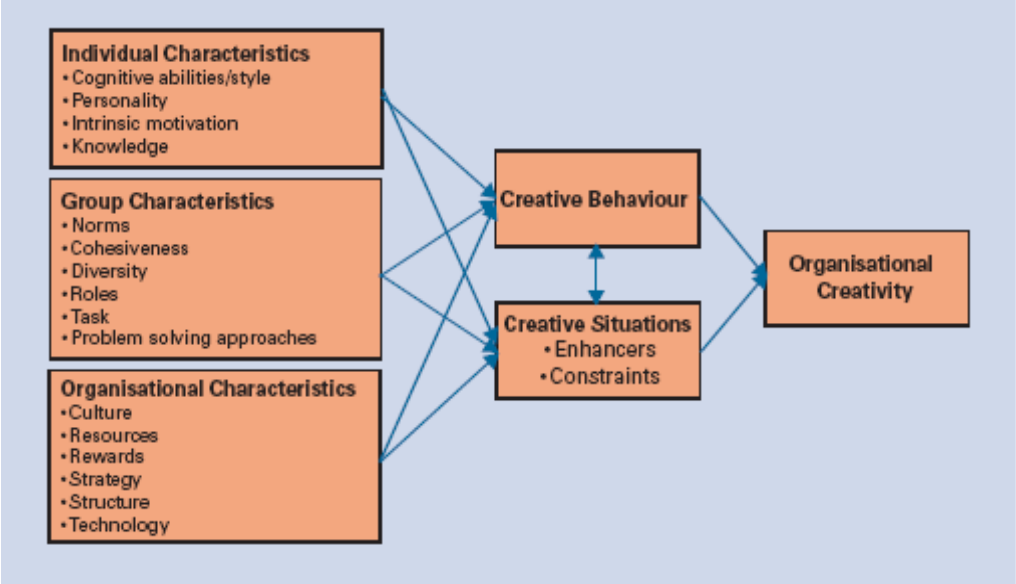
second example, training in creativity techniques might improve creativity skills. Intrinsic motivation, therefore, is central to sustainable creative behaviour that might be stimulated by a supportive climate. However, multiplicative interaction of such factors is highly complex and based on research to date both interactions might be supported.

2.1.5.4 *Woodman et al's (1993) Interactionist Model*

The interactionist model (Woodman and Schoenfeldt 1989; Woodman, Sawyer et al. 1993) has much in common to the above models in providing an integrating framework that combines important elements of the personality, cognitive and social explanations of creativity at each level of social organisation. This provides a framework of sufficient complexity to integrate the person, product, process and place components of creativity. The gestalt of the creative output for the whole system stems from the complex mosaic of individual, group and organisational characteristics and behaviours occurring within the salient situational influences existing at each level of the organisation. This clearly highlights the complexities of interactions as already discussed around Amabile's model.

According to Woodman et al's model, *individual* creativity is the multiplicative function of: antecedent conditions, sustainability (e.g. past reinforcement, history, biography); cognitive style and ability (e.g. divergent thinking, ideational fluency); personality (e.g. self-esteem, locus of control); relevant knowledge; intrinsic motivation; social influences (e.g. social facilitation, rewards); and contextual influences (physical environment, task and time constraints).

Figure 2-3 Woodman et al's (1993) Interactionist model of creativity



Source: Woodman, Sawyer and Griffin (1993)

It is suggested that *group* creativity mediates individual creativity through interactions with others and is influenced by: group composition and diversity; group characteristics (e.g. size, cohesiveness, performance); group processes (e.g. problem-solving strategies, social information processes); and contextual influences (e.g. larger organisation and characteristics of group task). *Organisational* creativity, according to this model, is a function of the outputs of component groups and contextual influences; for example, structure, culture, climate, resources, reward systems and the external environment. The primary difference with this model is the explicit inclusion of broad cultural factors and the contribution of individual antecedents to the development of motivations, values and personality traits. Organisational culture and, more specifically, organisational climate for creativity are central to this investigation and it is to these areas that the discussion now turns.

2.2 Organisational culture

Culture and climate represent complex and closely related phenomena that are frequently used interchangeably. Culture represents a broader concept and because of its intangibility, it is difficult to define. More than 200 definitions exist from numerous contributors. Society and

organisations are both, by definition, institutions and as individuals are socialised in a specific group they grow to learn the culture of that group, historically embedded and established or accepted shared values, beliefs, attitudes and practices that are slow to change. Within a culture the norms and routines of social interaction are taken for granted as people behave in ways they have learned through socialisation generally without question. Culture is, therefore, a shaping process for personal and social identity and helps to explain why people hold certain values and beliefs and behave the way they do.

One of the most influential contributors describes culture as the collective programming of the mind which distinguishes the members of one group or category of people from another (Hofstede 2001). Hofstede further identifies three levels of mental programming: human nature (physical and psychological needs and feelings of all human beings) that is universal and inherited; culture (how needs are met and feelings expressed), that is group specific and learned; and, finally, personality that is specific to the individual and is learned and inherited.

Schein highlights three different layers of culture (1992; 1996):- basic assumptions, beliefs and values, and artefacts and behaviour, from which he suggests it is the assumptions that lie behind the values and which determine behaviour. Therefore, cultural differences only become significant through social action, or behaviour. Hofstede (2001) presents a similar analysis with values at the core of culture that are invisible or intangible until they become evident in behaviour. For example, Hofstede suggests that behaviour might manifest in various ways. Collective rituals (accepted practices that are technically unnecessary but are considered essential within a given culture), that are often responsible for major cultural faux pas. Heroes, who possess characteristics highly prized in a culture and serve as models for behaviour (in the age of technology and media, celebrities and influential business people). Symbols, the most superficial layer manifest in words, gestures and dress. When people

speak of convergence of national cultures, for example, evidence is usually taken from the more superficial layers rather than values that lie at the heart of culture and are resistant to change.

Much of the above discussion is described in a relatively recent introduction to the academic literature on culture, through the cultural web that highlights aspects for the analysis of organisational culture (Johnson, Scholes et al. 2005):

- *Routine behaviours* – the ways in which members of the organisation behave towards each other and towards those outside the organisation and which make up how things are done or should happen
- *Rituals* – the particular activities or special events through which the organisation emphasises what is particularly important and can include formal organisational processes and informal processes
- *Stories* – told by members of the organisation that embed the present and flag up important events and personalities, and typically have to do with successes, failures, heroes, villains and mavericks
- *Symbols* – such as logos, offices, cars, titles, type of language or terminology commonly used which becomes a shorthand representation of the nature of the organisation
- *Power structures* – the most powerful individuals or groups in the organisation that may be based on management position and seniority but in some organisations power can be logged with other levels or functions
- *Control systems* – the measurement and reward systems that emphasise what is important to monitor, and to focus attention and activity upon
- *Organisation structure* – which reflects power structures and delineates important relationships and activities within the organisation, and involves both formal structure and control and less formal systems

- *Paradigm* – of the organisation that encapsulates and reinforces the behaviours observed in other elements of the cultural web.

Therefore, it is suggested that culture is stable, deep and reinforced by a history of decisions, power and learned strategies (Hofstede 2001; Trompenaars and Hampden-Turner 2004; cited in Isaksen 2007a).

In the dynamic environment in which businesses must now operate and compete, it becomes critical to realise the need to manage culture, underlying values and assumptions, to adapt to changing circumstances. Relating this specifically to the focus of this thesis on facilitating creativity, business organisations might emulate ideas and practices of more successful companies but if not supported by underlying values, it is unlikely they will produce the desired result in a different cultural context. The pervasiveness of organisational culture will facilitate or constrain change and, therefore, cultural change is necessary for organisational change to be effective. Indeed, based on a study investigating companies that did or did not intentionally and effectively manage corporate culture, Kotter & Heskett (1992) provide evidence of the long-term impact on economic performance (cited in Isaksen 2007a), as shown in Table 7.

Table 7 Economic impact of managing culture

Performance indicator	Manage culture	Do not manage culture
Increase in revenue	682%	166%
Increase in stock price	901%	74%
Increase in net income	756%	1%
	(Kotter & Heskett 1992 cited in Isaksen 2007	

Kanter's research on innovation that culminated in the now classic *Change Masters* book on intrapreneurship (Kanter 1983) comprised six studies involving more than 100 companies and in-depth case studies on 10 core companies that adopted qualitative interpretive analysis drawing on multiple data sources in each company. While the research did not focus on culture, the study titled 'Whole Company Cases: Structure, Culture and Change Strategies' specifically addressed organisational culture, as did the overall conclusions of her work. Kanter suggested that innovation is most likely to occur in organisations that (a) have integrative structures, (b)

emphasise diversity, (c) have multiple structural linkages inside and outside the organisation, (d) have intersecting territories, (e) have collective pride and faith in people's talents, and (f) emphasise collaboration and teamwork (Kanter 1988:383). This echoes early work on mechanistic versus organic forms of organising (Burns and Stalker 1961) and the potential for interdepartmental relationships to significantly influence an organisation's ability to develop new products (Laurence and Lorsch 1967) as well as the emphasis on integrative structures, multiple structural links with intersecting territories and horizontal communication are those typical of a matrix organisation.

> "The highest proportion of entrepreneurial accomplishments is found in the companies that are least segmented and segmentalist, companies that instead have integrative structures and cultures emphasising pride, commitment, collaboration and teamwork." (Kanter 1983:178).

Innovation is stifled through "a culture and an attitude that makes it unattractive and difficult for people in the organisation to take initiative to solve problems and develop innovative solutions" (ibid: 101). Ten rules focus on control of action, decision and information, hierarchical structures and lack of supervisor support or encouragement. There is considerable overlap in Kanter's qualitative work with organisational climate to which this discussion now turns and conceptual similarities are apparent with Amabile's quantitative KEYS Assessment of Creative Climate.

2.2.1 Organisational climate

While organisational culture might be considered as what the organisation is, climate represents an indication of the feelings and beliefs of employees in relation to policies, practices and procedures, in other words the perceptions that determine behaviour. For example, Tagiuri and Litwin (1968:27) suggest, "Organisational climate is a relatively enduring quality of the internal environment of an organisation that (a) is experienced by its

members, (b) influences their behaviour, and (c) can be described in terms of the values of a particular set of characteristics (or attributes) of the organisation". Similarly, Rentsch (1990:668) suggests "One assumption of climate theory is that organisational members perceive and make sense of organisational policies, practices and procedures in psychologically meaningful terms."

At an individual level the psychological climate refers to intrapersonal perceptions that characterise the group or organisation; the aggregate of which represents the organisational climate (Turnipseed 1994; Amabile 1996; Amabile, Coon et al. 1996; Isaksen and Lauer 1999a; Isaksen 2007a). Climate is distinct from culture in that it operates at a more accessible level and is more malleable, therefore conducive to change and improvement efforts (Moran and Volkwein 1992; McNabb and Sepic 1995; Amabile 1996; Amabile, Coon et al. 1996; Ekvall 1996; Isaksen and Lauer 1999a; Isaksen 2007a).

While one or two measures exist that assess perceptions of organisational environments more generally, for example, design, structure, functions and broad dimensions of the work environment, these do not specifically focus on the climate for creativity (e.g. Amabile, Burnside et al. 1999). Extensive literature searches undertaken for the current investigation revealed no other measures to challenge Amabile et al's claims that the KEYS Survey: Assessing the Climate for Creativity is the only psychometric instrument designed for the purpose. Another instrument does focus on creativity for use in business organisations (Siegel Scale of Support for Innovation, Siegel & Kaemmerer, 1978 cited in Amabile, ibid.) but validity is questionable as due to sampling based on schoolteachers and students. Another measure developed around the same time as KEYS and appears to be very similar is the Creative Climate Questionnaire (Ekvall, Arvonen et al. 1983; Ekvall 1996). Although considerable data on Swedish companies exists and this instrument is frequently cited in published literature sources, its psychometric properties

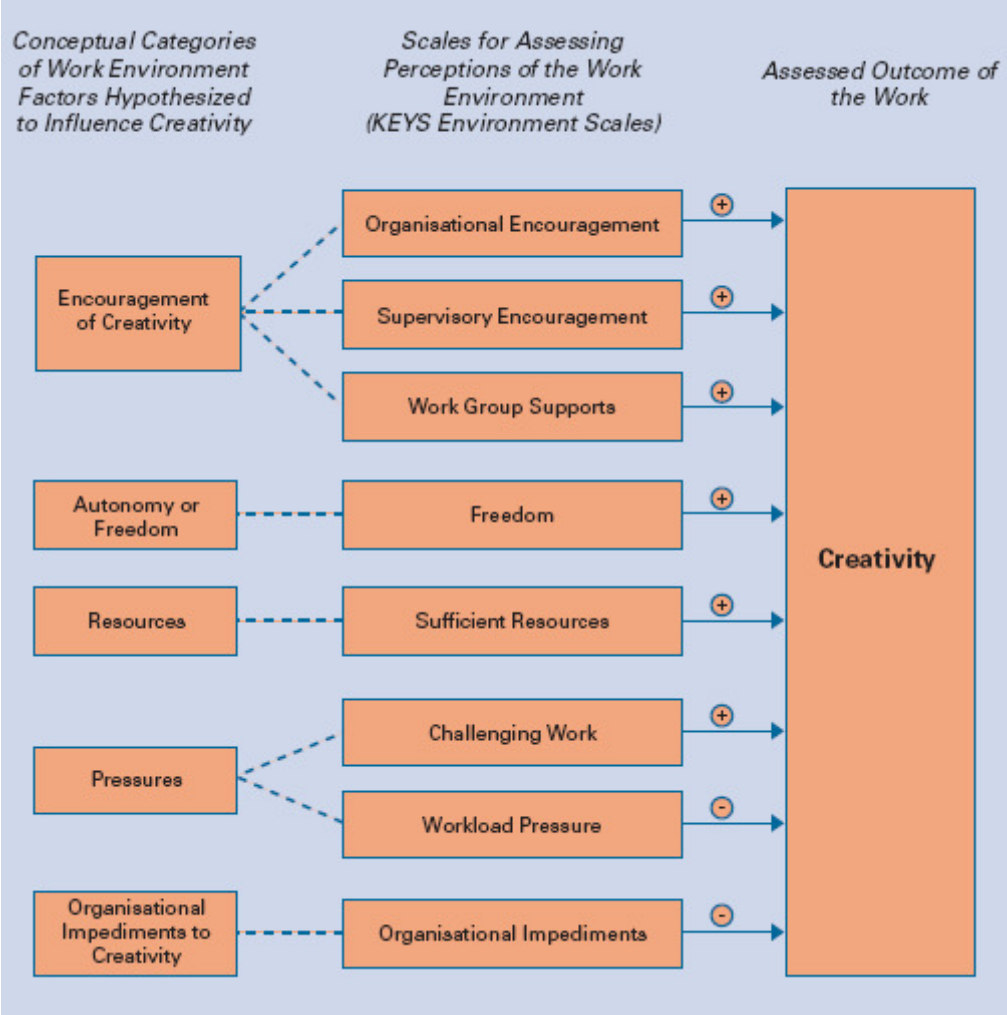
have not been published. The only other instrument identified in the search is the Situational Outlook Questionnaire (Isaksen and Lauer 1999a; Isaksen, Lauer et al. 1999b; Isaksen 2007a) which comprises nine dimensions and three open-ended narrative questions. This demonstrates considerable overlap with KEYS although structured differently and incorporates idea time rather than *Workload Pressure*. However, there is a greater emphasis on leadership, innovation and change, which would detract from the focus of this investigation. Amabile's is the only model to include a *Workload Pressure* dimension.

The KEYS survey (Amabile, Burnside et al. 1999) is developed from Amabile's (1983; 1996) componential model of creativity, outlined above under 'Confluence theories' and is based on the perceptions of staff that ultimately determine motivation and behaviour, critical to the investigation in hand. The conceptual categories for KEYS were developed from a review of previous research and a critical incidents study of high and low creative events among research and development scientists (Amabile and Gryskiewicz 1987; Amabile 1988). Psychometric analyses were conducted on KEYS data collected from 12,525 managers and employees across a range of organisations, including public management programs and organisations representing a number of industries including high technology; biotechnology and electronics; chemicals, pharmaceuticals and health products; traditional research and development; manufacturing; banking; and consumer products, during the period 1987-1995 (Amabile, Burnside et al. 1999).

KEYS was designed to assess perceptions of *all* the major work environment dimensions that have been suggested as important in empirical research and theory of creativity in organisations. It is based on the underlying assumption that self-report responses reveal respondents' perceptions, the psychological meaning that respondents attach to events in their organisation (Amabile 1983; 1993; Amabile, Hill et al. 1993; Amabile 1996; Amabile, Coon et al. 1996; Amabile, Burnside et al. 1999). The scales of KEYS assess stimulants and obstacles to creativity based

on the dimensions of organisational, supervisory and work group encouragement, autonomy, resources and pressures that distinguish between high and low creative environments.

Figure 2-4 Conceptual Model Underlying Assessment of Perceptions of the Work Environment for Creativity



The scales predicted to be positively related to creativity are referred to as stimulant scales and those predicted to be negatively related are referred to as obstacle scales.
Source: Amabile, Conti, Coon, Lazenby and Herron (1996b)

The relevance of KEYS to the proposed study is that it provides an empirically based and validated means of assessing important organisational determining elements and broad components of creativity. Figure 2-4 illustrates the scales and the conceptual framework for KEYS. *Organisational Encouragement*, *Supervisory Encouragement*, *Work Group Support*s, *Freedom*, *Challenging Work* and *Freedom* represent the stimulant scales, supportive of creativity. The two obstacle scales are

Workload Pressure and *Organisational impediments*. The remaining two scales are criterion measures of *Productivity* and *Creativity.* Table 8 provides descriptions and examples for each of these scales. Based on the strength of differentiating factors between high and low creativity projects resulting from a validity study (Amabile, Taylor et al. 1995) these scales can be grouped as follows according to their relative contribution:

FIRST TIER

- *Work Group Support*
- *Challenging Work*
- *Organisational Encouragement*

SECOND TIER

- (Lack of) *Organisational Impediments*
- *Freedom*
- *Supervisory Encouragement*

THIRD TIER

- (Lack of) Workload Pressure
- *Sufficient Resources*

Amabile et al's original hypotheses suggested firstly that the work environment stimulant scales on KEYS will be rated significantly higher in projects rated as highly creative, than in projects rated less creative, for the following scales: (1a) *Organisational Encouragement*, (1b) *Supervisory Encouragement*, (1c) *Work Group Support*s, (1d) *Freedom*, (1e) *Sufficient Resources* and (1f) *Challenging Work*. Secondly it was suggested that the work environment obstacle scales on KEYS will be rated significantly lower in projects rated as highly creative, than in projects rated as less creative, for the following scales: (2a) *Workload pressure* and (2b) O*rganisational Impediments*.

Table 8 Scales for assessing perceptions of the climate for creativity

KEYS Scales			
Scale name	**Items**	**Description**	**Sample item**
Stimulant scales			
Organisational Encouragement	15	An organisational culture that encourages creativity through the fair, constructive judgement of ideas, rewards and recognition for creative work, mechanisms for developing new ideas, an active flow of ideas, and a shared vision of what the organisation is trying to do	People are encouraged to solve problems creatively in this organisation
Supervisory Encouragement	11	A supervisor who serves as a good work model, sets goals appropriately, supports the work group, values individual contributions and shows confidence in the work group	My supervisor serves as a good work model
Work Group Support	8	A diversely skilled work group in which people communicate well, are open to new ideas, constructively challenge each other's work, trust and help each other and feel committed to the work they are doing	There is free and open communication within my work group
Sufficient Resources	6	Access to appropriate resources, including funds, materials, facilities and information	Generally I can get the resources I need for my work
Challenging Work	5	A sense of having to work hard on challenging tasks and important projects	I feel challenged by the work I am currently doing
Freedom	4	Freedom in deciding what work to do or how to do it; a sense of control over one's work	I have the freedom to decide how I am going to carry out my projects
Obstacle scales			
Organisational Impediments	12	An organisational culture that impedes creativity through internal political problems, harsh criticism of new ideas, destructive internal competition, an avoidance of risk, and an over emphasis on the status quo	There are many political problems in this organisation
Workload Pressure	5	Extreme time pressures, unrealistic expectations for productivity and distractions from creative work	I have too much work to do in too little time
Criterion scales			
Creativity	6	A creative organisation or unit, where a great deal of creativity is called for and where people believe they actually produce creative work	My area of this organisation is innovative
Productivity	6	An efficient, effective and productive organisation or unit	My area of this organisation is effective

While Amabile's focus was on high and low creative companies, the majority are likely to be in between and, if the model is to be useful to such organisations it is important to explore the implications of the model for typical cases. It is also important to explore whether the relative significance of the above tiers are maintained in companies that are less creative. Further, how might individual differences such as personality characteristics interact with climate factors?

2.2.1 Creative Requirement and Self-efficacy

Two human drives are suggested to exist independent of race, creed or culture that rise above all others; the need for self-belief and the need for a sense of meaning and purpose in our lives (Whitmore 2002). Both are central to business performance and generating a climate of creativity within an organisation must recognise their significance. Tierney and Farmer (2002) extended the notion of self-efficacy (Bandura 1977), the extent that individuals believe they have the ability to accomplish specific objectives, to creative self-efficacy, the extent to which they believe they have the ability to produce creative outcomes. Extending this notion to creative role identity, whether an individual considers they are creative (Farmer, Tierney et al. 2003), the highest creativity was evident when creative role identity was high and individuals perceived their organisation valued creative work. Creative requirement, the perception that one is expected to generate creative ideas (Unsworth, Wall et al. 2002), increasingly seems to be emerging from recent studies as a very important concept supportive of creativity and innovation. For example, support for the importance of creativity goals appears to be increasing (Shalley 1995) and recently two studies have specifically investigated creative requirement (Shalley, Gilson et al. 2000; Unsworth, Wall et al. 2002). Both concepts form a part of the subsequent discussions on the limitations of existing research.

2.3 Limitations of research to date

While the important contributions and interactions of what might broadly be termed the individual, social and organisational components of complex systems typical of business organisations to creativity and innovation are documented in the foregoing discussion, empirical investigation at this level is rare. In fact, none was revealed through the extensive literature searches undertaken during this investigation. The rather lengthy citation of Woodman et al. (1993) highlights what these authors considered to be problematic at that time, and it is suggested that many of these problems remain today.

> In their concluding comments, Woodman et al (1993:316) suggest:
>
> '… after decades of theory development and empirical research, researchers still know surprising little about how the creative process works, especially within the context of complex social systems such as formal organisations. From the standpoint of basic research, for example, we can make few definitive statements regarding the determinants of creativity in organisations, the processes by which it manifests itself and how it is enhanced or inhibited. From the applied side, we also know little about how organisations can successfully promote and manage individual and organisational creativity. Much of this is due to a failure to consider measurement issues, generalization from studies of individual creativity to organisational processes without empirical verifications of these generalisations, and the failure to consider composition theories and aggregation problems when crossing levels of analysis. However, it is our contention that the major factors in these shortcomings have been the fragmented approach that many scholars have taken regarding the study of creativity. In particular, the dominant approach has been to study creativity from a single perspective and without regard for many of the subtle nuances likely to be associated with such a complex process. The failure to adopt an interactionist perspective, for example, leads almost inevitably to an incomplete perspective on creativity. Another shortcoming has been the failure to specify the constructs under study. In particular, it should be useful to disaggregate the construct of creativity from the broader construct of innovation. Organisational researchers have done a relatively poor job in this respect (West & Farr, 1990). Further, researchers must specify whether creative persons, products, processes or situations are being investigated, and they must use appropriate measures for proposed constructs. Various research streams have tended to focus narrowly on only one of these components (Brown, 1989).'

Although proposing a different focus these authors clearly argue the need for a systemic approach. Almost twenty years' later very little, if any, of creativity research appears to have adopted a comprehensive systemic

approach, undoubtedly because of the inherent difficulties in the possible number and complexity of components.

Regardless of the comprehensiveness of Amabile's (1983; 1988; 1993; 1996; Amabile, Coon et al. 1996; Amabile, Burnside et al. 1999) and other interactionist models (Woodman and Schoenfeldt 1989; Csikszentmihalyi 1991; Sternberg and Lubart 1991; 1992; Woodman, Sawyer et al. 1993; Sternberg and Lubart 1996; 1999) and recognition of the importance of individual characteristics, empirical investigation at the level of the system is still lacking. This is reinforced by a recently published articles that extol the virtues of a systemic approach consistent with the interactionist approach to creativity (Isaksen, Puccio et al. 1993; Isaksen and Tidd 2006) based on the 'dismal results' of efforts that focus on individual or multiple elements, as opposed to the main components of the system (Isaksen 2007a). Although research on organisational creativity has progressed in providing some potentially important and interesting findings and associations based on elements of confluence theories and models, many of these problems remain apparent. During the period of this investigation, many studies have adopted an 'interactionist' approach, yet rarely do these include a comprehensive range of components in a single study. Inconsistency in the diverse range of sub-components/elements between studies results in a lack of data that might reliably inform theory or practice.

During the period of this investigation a publication emerged reporting on a systematic review of empirical research on personal and contextual characteristics that support or inhibit creativity (Shalley, Zhou et al. 2004a). These authors adopted a very similar conceptual framework approach to that of this investigation in suggesting that in order to understand creativity it is necessary to consider both interactions between personal and contextual characteristics and interactions among different contextual characteristics (ibid:936). These authors also suggest that individual characteristics such as personality and cognitive style interact differentially with contextual factors. This is supportive of the limitations of existing

research currently under discussion. Examples illustrative of such problems demonstrate the current fragmentation of research on organisational creativity, while acknowledging their relevance to current conceptualisations and gaps in understanding and application that formed the basis of the current study.

For example, literature searches resulted in investigations including leadership (characteristics, leader-member exchange, supporting/ controlling supervision), co-worker support, feedback (valence and style), task type, goal specificity, task autonomy, support for innovation, problem-solving/cognitive style, intrinsic motivation and personality. Similar observations (Unsworth, Wall et al. 2002) suggest key emerging factors as autonomy, support (leader/co-worker), and time demands. Another study (Tierney, Farmer et al. 1999) based on a multi-domain interactionist creativity model, employing a sample of 191 employees in the research and development department of a chemical organisation, investigates employee and leader characteristics and leader-member exchange, including control variables of educational level, organisational tenure and hierarchical level . Findings suggest that employee intrinsic motivation and cognitive style based on Kirton's (1976) adaption-innovation inventory, leader-member exchange, interactions between employee intrinsic motivation and leader intrinsic motivation and between leader-member exchange and employee cognitive style, relate to employee creative performance as measured by supervisor ratings, invention disclosures and research reports. Cognitive innovators, no matter what type of relationship with supervisors, experienced high levels of creative output. However, cognitive adaptors in high quality dyads were consistently more creative than were adaptors in low quality dyads. What this would seem to suggest is that cognitive innovators are independent creators whilst adaptors need support to exhibit creative behaviour. The only other study which used Jabri's similar, but more accessible, measure of cognitive style (Scott and Bruce 1994) did not specifically investigate support and, therefore, direct comparison is difficult. However, this suggests some similarities with

studies of personality dimensions where conflicting findings are evident for supportive climate (Oldham and Cummings 1996; Madjar, Oldham et al. 2002; Zhou and Shalley 2003).

Yet others (Zhou and George 2001) have investigated conditions under which job dissatisfaction might lead to creativity as an expression of voice. Findings propose interaction of co-worker support and feedback, perceived organisational support for creativity and continuance commitment (necessity). The assumption is that employees will attempt to be creative if valued and supported by the organisation and management and that job dissatisfaction may trigger new and better ways of doing things when continuance commitment is high. Findings are interesting yet deviate from the main factors of the interactionist approaches and, at this stage, their usefulness to theory and practice is limited.

One of the more influential studies (Oldham and Cummings 1996) proposed multiplicative interaction of creative personality characteristics with contextual characteristics based on the motivation potential of job complexity, with supportive versus controlling supervision. Findings suggest workers produced the most creative work when they possessed appropriate creativity relevant characteristics based on the Creative Personality Scale of the Adjective Check List (Gough and Heilbrun 1965; Gough 1979); worked on complex, challenging jobs, based on the Motivating Potential Scale of the Job Diagnostic Survey (Hackman and Oldham 1980); and were supervised in a supportive, non-controlling style, providing informational feedback (Deci and Ryan 1985).

Further findings of this study (Oldham and Cummings 1996) suggest the absence of any of these conditions adversely affected creative performance for those with high creativity relevant personality characteristics. However, for individuals with few creativity-relevant personal characteristics job enrichment and supporting supervision may have few effects or may adversely affect creative achievement. Similar

findings emerged from another study suggesting that less creative personalities respond less well to support (Madjar, Oldham et al. 2002). On the other hand, findings of yet another investigation suggested that the combination of low supervisor monitoring and the presence of creative co-workers increased employee creativity generally but that the contribution of the joint condition was stronger for less creative personalities (Zhou 2003). However, this investigation was based on a small sample in a not-for-profit organisation and a larger sample in a for-profit hospital, both of which are somewhat atypical compared to the majority of business organisations. While the findings of these investigations appear significant and influential within the research community, in the absence of a comprehensive, systemic approach demanded by the interactionist models, possible masking of important factors or confounding effects remain. More recently further research supported an inverted U-shaped relationship between time pressure and creativity for employees in a supportive environment and scoring high on *Openness to experience* (Baer and Oldham 2006).

Other influential investigators (Scott and Bruce 1994) employing 22 research and development engineers, scientists and technicians, developed a social interactionist model through which leadership, work group relations, and individual problem solving style were hypothesised to affect individual innovative behaviour directly and indirectly through employee perceptions of climate. Many hypotheses were not supported. However, leadership, support for innovation (not resources), managerial role expectations (creative requirement), career stage and systematic problem-solving style resulted in a model explaining a substantial 37 percent of the variance in innovative behaviour. While these findings are potentially significant, the investigation still employs only a partial set of components that might mask or confound potentially important factors.

Another experimental study on a student population (Shalley, 1991) investigating productivity goals and creativity goals (difficult, do-your-best

or no) using a complex, heuristic task (open-ended, ill-structured) based on an in-basket exercise found that those assigned the difficult productivity goals performed significantly better than on either of the other two conditions. However, for difficult and do-your-best creativity goals there was no significant difference in performance although both were significantly better than those assigned no creativity goal, suggesting that priming for creativity motivates individuals to focus their attention and effort on being creative. It is extremely interesting to note that Scott & Bruce (1994), above, link expectations with creative behaviour as do most of the above studies, with the notable exception of Oldham & Cummings (1996). This is important to the notion of creative requirement to which the discussion now turns.

Support for the importance of creativity goals appears to be increasing and recently two studies have specifically investigated creative requirement – individual perceptions of the need for or desirability of creative behaviour (Shalley, Gilson et al. 2000; Unsworth, Wall et al. 2002). Using a rating of creative role requirement provided in the Dictionary of Occupational Titles and a single-item self-report measure, Shalley et al (2000) found positive associations with proximal factors of high job complexity, high empowerment and high time demands and negative association with organisational controls and distal organisational characteristics. Unsworth et al (2002), in the search for a more parsimonious model of creativity, specifically investigated creative requirement in relation to four work factors found to be predictive of employee creativity: empowerment, leader support, support for innovation and time demands. Creative requirement was found to represent an important determinant of employee creativity, accounting for much of the variance by fully mediating the effects of supportive leadership and role requirements and partially mediating those of empowerment and time demands. However, this study did not specifically investigate organisational characteristics. Intuitively, it is no surprise that creative requirement has a greater influence on creative behaviour than more distal

organisational factors as proximal factors represent salience and meaning to individual roles and goals. However, as these authors suggest, this has been a neglected factor. Creative requirement should represent a direct or indirect influence in respect of which substantial support exists, in communicating common goals, or the zeitgeist, of a shared intellectual community and which is compatible with these authors' findings that creative requirement fully mediates the effects of supportive leadership, role requirements and, to a lesser extent, empowerment and time demands.

Interactionist models identify components necessary in facilitating organisational creativity and innovation. However, at this time, rarely if ever, has research focussed on all major components. Most models have in common the interaction of individual, social and organisational components. The KEYS survey (Amabile, Coon et al. 1996; Amabile, Burnside et al. 1999) derived from Amabile's (1996) componential model assesses the work environment and includes many of the elements that form a part of the above discussion. However, beyond Amabile's research a lack of evidence suggests a lack of application for research in work organisations. During the course of this investigation, only one study was reported to utilise the KEYS survey in its entirety rather than employing a limited number of related but fragmented elements. The aim of this study (Ensor, Pirrie et al. 2006) was to compare the working environment of two UK advertising agencies against Amabile's conceptual categories. Results for the agencies suggest strong reinforcement of two stimulant scales, *Organisational Encouragement* and *Work Group Support*; and one obstacle scale, lack of O*rganisational Impediments*. For the '*Challenging Work*' scale the agencies were well below the KEYS database norms and the *Workload Pressure* scale also appears contradictory (Ensor, Pirrie et al. 2006).

However, beyond a conceptual level, empirical investigation of the contribution of personality at a systemic level is rare (Woodman, Sawyer et

al. 1993; Csikszentmihalyi 1999; Isaksen 2007a). While the strength of Amabile's componential model (Amabile, Coon et al. 1996), lies in the emphasis on motivational and social factors, personality appears to have become subsumed, intentionally or otherwise, by motivation. Emphasis on social and organisational factors together with the realisation that all individuals have the potential to be creative have led to a premature downplay of personality characteristics. Yet the contribution of personality characteristics to creativity remains unclear. Undoubtedly, existing knowledge suggests there is overlap between individual differences and motivation. Might it be unreasonable to postulate the notion that for individuals demonstrating creativity relevant characteristics different elements of organisational climate might be more motivational in stimulating and supporting creativity compared to innovation?

Limitations of current research are twofold. The first is to highlight important findings that potentially make a significant contribution to our knowledge and understanding of organisational creativity as it feeds innovation. The second must be to highlight the fragmented focus on limited elements rather than a systemic approach that takes into account the main components of the interactionist perspectives. Investigation of limited numbers of elements illuminates only part of the bigger picture, potentially masking or confounding significant factors. A basic tenet of questionnaire-based research is of course that participants are only able to respond to those questions asked. If researchers do not ask questions relevant and sufficient in addressing factors contributing to creative behaviour then how might theoretical and practical implications be extended such that rhetoric becomes reality for organisations aspiring to develop sustainable competitive advantage through the stimulation of latent creativity?

Increasingly evident is the need to differentiate between determinants of creativity, defined as the generation of original and useful ideas, and determinants of innovation, defined as the implementation or exploitation

of creative ideas, based on increasing evidence of differences between factors that facilitate creativity and those that facilitate innovation. Also emerging from the research literature seeking to identify creativity relevant personality characteristics is the need to differentiate between those characteristics that enhance idea generation and those that are supportive of the exploitation of creative ideas including, for example, high degrees of persuasion, persistence, motivation and influence. While studies that have attempted to investigate personality in relation to specific elements of the interactionist models have provided support for the *Openness* and *Conscientiousness* dimensions of the five-factor model of personality (Costa and McCrae1985; 1992) in facilitating and inhibiting creative behaviour respectively (George and Zhou 2001), others highlight the necessity of conflicting characteristics (Csikszentmihalyi 1996; Feist 1998) for generating ideas of value (creativity) and recognition of those ideas (implementation). For example, another study suggested idea generation was more highly related to the proximal factors of individual and job characteristics than group or organisational characteristics, while implementation was more strongly predicted by more distal group and organisational factors (Axtell, Holman et al. 2000). This is not dissimilar to suggested positive associations of creativity with proximal factors and negative association with organisational controls and distal organisational characteristics (Shalley, Gilson et al. 2000). A further study found that markedly different processes that are essentially independent of each other affect novelty (creativity) and social validation (implementation). Novelty was related to negative feedback, an evolutionary process reflecting the influence of context, a common perspective among decision makers, lack of familiarity with potential solutions and use of flexible decision processes. Value was positively influenced by subjective issue importance, absence of disruptive external forces, both evolutionary and contextual, and trust among decision makers (Ford and Gioia 2000).

Idea generation is primarily an intrapersonal process whilst implementation, necessarily resulting from continually evolving variation

and selection processes (Simonton 2003) represents an interpersonal, social process (Van de Ven, Angle et al. 1989) requiring the involvement and agreement of interested stakeholders, and subject to relative benefits and sufficient time and resources. Creativity, therefore, is a complex phenomenon involving intraindividual processes that interact to produce creative action, and interactions among interested stakeholders (i.e. fields), accepted wisdom (i.e. domains) and creative actors and interactions within and among multiple levels of fields and domains that determine the viability of a creative act (Ford 1996). Differentiation between creativity and innovation processes is important in advancing the theoretical understanding and practical application of creativity and innovation.

2.4 **Meaning and Value**

Most research fails to differentiate between the originality and value dimensions of creativity, which is important to avoiding the confounding of intrapersonal, psychological and interpersonal, social and organisational factors. For example, 'How and why do certain innovative (creative) ideas gain good currency?', 'How and why do people pay attention to only certain new ideas and ignore the rest?' (Van de Ven 1986) and 'Why are some works broadly valued and influential while others are not? (Weisberg 1993; 2006). Within an organisational context, what is valued depends on strategic aims and direction as well as resources and what is successfully adopted and implemented might depend on individual characteristics and influence.

Outcomes of creative idea generation can take many forms, the literature being pebbled with references to various 'types', of creativity or innovation. For example, 'radical' versus 'incremental' might be perceived on the basis of relative scale, major/minor respectively, the former tending to be conceptualised as high novelty and high risk and characterised by greater uncertainty and complexity during the innovation implementation process, the latter likely to involve lower novelty and risk (Zaltman, Duncan et al. 1973). Whilst 'radical' and 'incremental' represent opposite ends of the

spectrum, either can be highly creative in terms of originality. More meaningful to organisations is the relative focus on 'doing things right/better' versus 'doing the right/better things'. Whilst the subjectivity of originality and value prevent clearly defined boundaries, organisational objectives determine the type of creativity valued and management are likely to be expert judges.

Storey (2000) addresses the management of innovation problem by investigating the interaction of the individual with the social dynamics of the organisational context. By attending to the perceptions, assumptions, interpretations and cognitions of managers, particularly in terms of the 'illegitimacy' of innovation in established firms (Dougherty 1994:351) and the strategic issue of an organisation's capability and preparedness to innovate and change, both of which highlight socio-political influences on innovation. For example, to be innovative is to challenge the established order (Storey 2000) and neither creativity nor innovation might be perceived as desirable by members of established organisations that operate on the basis of routines and standardisation, reinforced by power and status systems.

Storey (ibid.) found extensive differences between managers in the same company and even among managers in the same top-level teams about the actual meaning of the injunction to be innovative, the priority that should be accorded to it, the ways in which the organisation would need to behave to facilitate this objective. This clearly illustrates the confusion in organisations between the rhetoric of creativity and innovation and its application in practice. Successful exploitation of new ideas must overcome competing expectations, strategies and rationales in addition to institutionalised routines and inertia.

Storey's (2000) study provides further useful findings. For example, at one end of the spectrum were large-scale, routine innovations (e.g. Zeneca) demonstrating a shared and reasonably stable repertoire of ways to

deliver on this objective, whilst at the other end of the spectrum were enterprises (e.g. software, advertising) whose approach to innovation was much more individualised and openly creative, involving fun-days, 'surprises' punctuating the day, for example. However, this review reveals that the broad band of organisations located between these two extremes and possibly representing the main bulk of organisations in the UK, all of which were under pressure by varying degrees to be 'more innovative', had neither routine innovation nor adopted an array of creativity events and were faced with conflicting examples. Organisations aspiring to be creative and innovative very clearly have problems translating rhetoric into reality. What do creativity and innovation mean to an organisation? How might greater understanding of interactions of individual, social and psychological factors support facilitation of the dynamic processes of creativity and innovation? If organisations do not understand what it means to be creative and innovative successful exploitation of new ideas might need to overcome competing expectations, strategies and rationales among management, as Storey (2000) suggests. In the absence of shared meaning, how can a supportive climate for creativity exist?

2.5 Human Resource Management and Development

Factors identified in the interactionist models as important to supporting the level and frequency of creativity have much in common with human resource management (HRM) and development (HRD). Central to HRD are close relationships between the interactionist models of creativity and innovation, theories of organisational learning (e.g. Senge 1990; Pedler, Burgoyne et al. 1996; Marsick and Watkins 2003), knowledge creation and management (Nonaka, Toyama et al. 2000). All emphasise that humans and organisations are dynamic beings that have the potential to learn and grow together. Innovative companies tend to be characterised as knowledge creating (Nonaka and Takeuchi 1995) and a blurring of the boundaries between research on knowledge management and innovation has become evident in recent years, knowledge and intellectual capital underpinning innovative outcomes (Dougherty 1992; Tsai and Ghoshal

1998; Ahuja 2000; Subramaniam and Venkatraman 2001). Others suggest that concepts of knowledge management and organisational learning usefully integrate with creativity by using knowledge for creative adaptation and flexibility in the 'Thinking Organisation'; adaptability is concerned with problem finding and defining as a basis for creative solutions, while flexibility is concerned with turning unexpected events or crises into opportunities (Basadur and Gelade 2006).

Integration of creativity, innovation and knowledge management research with HRM and HRD is attracting increasing interest (Scott and Bruce 1994; Juniper 1996; Keltner and Finegold 1996; Janssen 2000; Searle and Ball 2003; Leede and Looise 2005; Shipton, Fay et al. 2005; Shipton, West et al. 2006; Jørgensen, Laugen et al. 2007). Others specifically emphasise the importance of knowledge and learning to the connections between HRD and creativity in relation to core issues including enhancing the social context to enable creativity (e.g. Egan 2005; Gibb and Waight 2005; Madjar 2005), changing cultures to promote innovation (McLean 2005), understanding and leveraging individuals (Egan 2005). Creativity is necessary for knowledge creation and management of ideas is essential in ensuring efforts are not wasted. This is important to maintaining workforce motivation (Amabile, 1996).

Of course, there are different approaches and perspectives on HRM. For example, the *high commitment* perspective has led to suggestions of one best way of managing people through which a coherent and comprehensive bundle of aligned human resource practices positively impact on performance.

Demonstrating the contribution of *best practice* HRM to superior performance is not simple although evidence is increasing (e.g. Guest 1997; Huselid, Jackson et al. 1997; Purcell, Kinnie et al. 2003; Boxall and Purcell 2008). However, evidence of the contribution of HRM to facilitating creativity remains scarce (Shipton, West et al. 2006). *Best practice* HRM is far from prevalent and it is possible that *high commitment* models might

not be universally appropriate to all business organisations (Marchington and Wilkinson 2008:137).

Table 9 Competitive strategies and HRM (Marchington and Wilkinson 2008:147)

HR Practices	Competitive strategy		
	Cost reduction	Quality enhancement	*Innovation*
Resourcing	Ad hoc methods predominate, use of agencies and subcontractors. Tight performance management	Sophisticated methods of recruitment and selection Comprehensive induction and socialisation	Focus on core competencies and transferable skills Agreed performance outcomes
Learning and development	Poor or non-existent training in specific and immediate skills	Extensive and long-term focus Focussed on learning and career development	Provided if necessary Personal responsibility for learning
Employee relations	Little EI or communications Non-union workplace or unions tolerated	Well-developed systems for employee voice Partnership arrangements	Preferences for informal communication systems Professional associations
Reward Management	Low pay levels No additional benefits	Competitive pay and benefits package Harmonisation	Cafeteria reward system Share ownership/ profit sharing
HR function	Slimmed down Lacking in influence	Work closely with line managers Potentially large influence	Advice and support for employees Potentially some influence

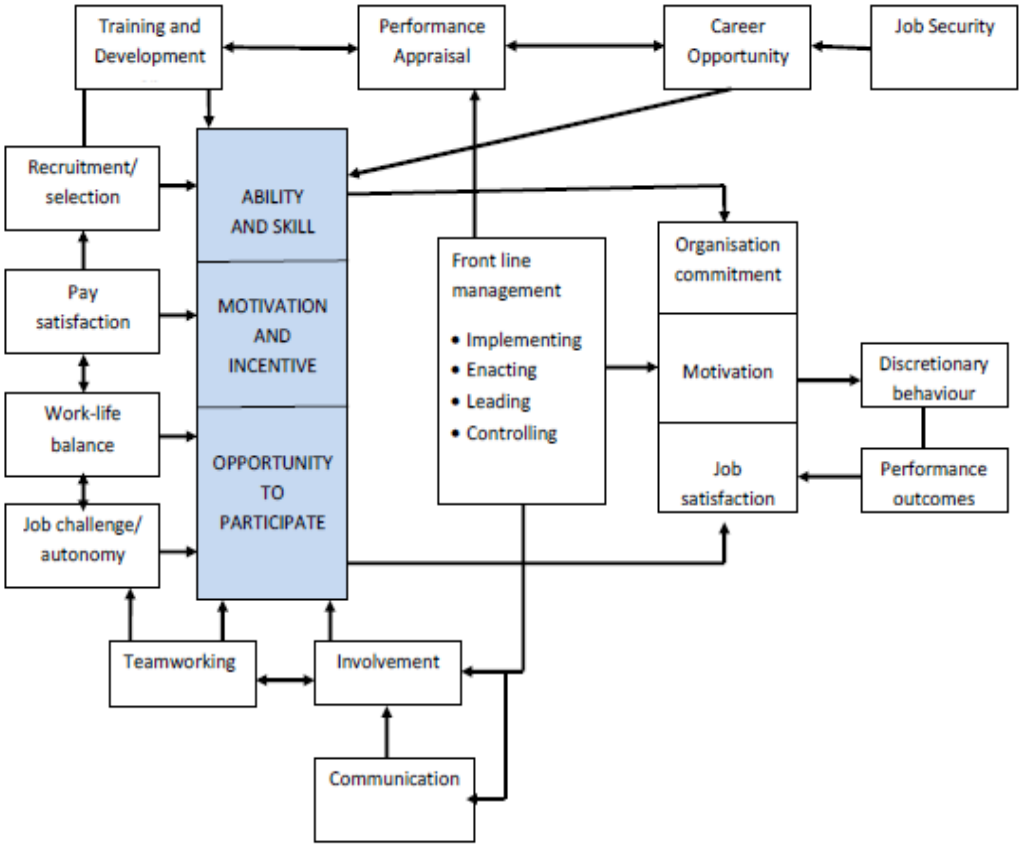
Adapted from Sisson and Storey (2000)

HRM policies are contingent upon factors in the external and internal environments and a network of stakeholders. An alternative to universal high commitment best practice are the 'best fit' models, each of which focus on the influence of different contextual factors including life-cycle and competitive strategy. While such approaches immediately raise concerns regarding the value of attempting to isolate dynamic contextual factors these models highlight salient issues, such as that which suggests appropriate HR practices for each of Porter's (1985) competitive strategies, as shown in Table 9. For example, this is particularly effective in illustrating the lack of investment in most areas of HR for the *cost reduction strategy* where training is minimal, pay low and staff turnover often high.

In direct comparison, human resource policies are likely to resemble *high commitment best practice* where the strategy aims for differentiation from competitors, as with *quality enhancement*. This model assumes that the innovation strategy applies only to specific specialist groups rather than the whole organisation. This fails to reflect current perspectives on creativity and innovation. Further, in most SMEs it is unlikely such groups are managed separately, although with some exceptions as will be discussed later in respect of particular human resource practices. The *innovation* strategy is likely to emulate *best practice* yet it is interesting to note greater emphasis on independence and professionalism as evident from differences in learning and development, employee relations and reward management, for example. The implication is almost that innovation does not need managing. While this might be the case for naturally, highly creative individuals, the prevailing assumption that all individuals have potential to be creative draw such assumptions into serious question.

Links between creativity, innovation and strategic HRM/HRD draw on theories that view people as the main source of competitive advantage. For example, resource-based theory (RBT) suggests that sustainable competitive advantage depends on superior, valuable, rare, non-substitutable resources (Barney 1991; Boxall and Purcell 2008). Essentially human resource value creation develops a strong internal pool of labour and a strong organisational culture and climate not easily imitated by competitors. It is suggested that the Ability, Motivation, Opportunity (AMO) model (e.g. Purcell, Kinnie et al. 2003), which identifies eleven policies suggested as stimulating discretionary behaviour, offers potential for integration with the interactionist models of creativity (see Figure 2-5). The essence is that human resource value creation develops a strong internal pool of labour and a strong organisational culture and climate not easily imitated by competitors.

Figure 2-5 The People and Performance Model (Purcell, Kinnie et al 2003)



The People and Performance Model (Purcell, Kinnie et al 2003)

In contrast to a prescriptive bundle of definitive best practices as suggested by a universalistic model of HRM the AMO model supports the notion that 'different sets of practices may be equally effective so long as they allow a particular type of climate to develop' (Bowen and Ostroff 2004). From this perspective combinations are multiplicative in determining the relative strength of the system and are appropriate to the current focus in examining a climate supportive of creativity and innovation.

2.6 Summary of planned research

Interesting and potentially important findings have emerged from previous research. However, the majority investigate specific elements rather than all main components. This results in a fragmented body of research literature, which leads to ambiguous evidence that does little to advance the understanding of creativity or to support theory that might reliably

inform practice. Interpretations of interactions between various combinations of specific elements might be incidental, overlooking spurious relationships or confounding factors. The complexity of interactionist approaches demands a systemic approach that poses difficulties for empirical investigations. Because of the lack of investigations at this level, the possibility of alternative explanations of relationships between various components remains open. However, if systemic investigation of the main components is supportive this reinforces the value through theoretical understanding that reliably informs practical application. Further, it is possible in the interests of parsimony that a simpler model may emerge. At this stage, the neglect of systemic empirical support precludes such possibilities. Resulting from the review and critique of relevant literature the key broad determinants of organisational creativity and innovation are intuitively conceptualised as strategy, culture, climate, creative requirement, meaning, training in creative problem solving, personality, cognitive thinking style, intrinsic and synergistic extrinsic motivation. The need to differentiate between different intrapersonal, interpersonal and organisational factors supportive of idea generation (creativity) versus implementation (innovation), and between individual and group outcomes is also evident. In this way, this investigation addresses the first research question:

RQ1: Are individual and group creative idea generation and implementation positively associated with supportive climate and appropriate personality characteristics and is it necessary to differentiate?

A major part of this investigation is the investigation of climate for creativity. Intended orientation and culture is unlikely to be homogeneous across sub-groups of an organisation. Climate for creativity refers to individual perceptions and the influence of those perceptions to creative behaviour. Whilst influences on creative behaviour may occur at various levels of the organisation, the source of the influence is less important to

creative behaviour than perceptions of the psychological meaning that individuals attach to their environments. According to the interactionist models of organisational creativity it is the psychological meaning of environmental events that largely influences creative behaviour (Amabile 1988; Woodman, Sawyer et al. 1993; Amabile 1996; Amabile, Coon et al. 1996) through individual perceptions of psychological climate, the aggregate of which moulds the organisational climate and sub-climates at the group level. Closely related to creative climate is the notion of creative requirement, which also represents an important component in creative behaviour. The two main studies that have investigated creative requirement, to date, have not attempted to relate this to the broader organisational orientation for creativity or to psychological and organisational climate.

Creativity is the seed of innovation and psychological perceptions of innovation, as the implementation of creative ideas, is likely to impact the motivation to generate new ideas (Amabile 1996; Amabile, Coon et al. 1996). Based on Amabile's (1983; 1996) componential theory of creativity, an instrument has been designed and validated (KEYS) to assess perceptions of all the work environment dimensions that have been suggested as important in empirical research and theory of creativity in organisations. The scales of KEYS assess stimulants and obstacles to creativity based on the dimensions of organisational, supervisory and work group encouragement, autonomy, resources and pressures and distinguish between high and low creative environments. The relevance of KEYS to the proposed study is that it provides an empirically based and validated means of assessing important organisational determining elements and broad components of creativity.

RQ2: Elements of creative organisational climate interact with appropriate personality characteristics in contributing to organisational creativity.

This potentially presents significant implications for both theory and practice of organisational creativity. For example, conflicting evidence raises questions of the contribution of various elements of the social environment for less creative personalities. Social and organisational experiences within the context of a specific organisation are shared and the view that all individuals have the potential to be creative fails to adequately answer the question 'why might one individual make a creative discovery while another individual, seemingly just as knowledgeable and motivated, does not do so?', (Weisberg 1993). Individual characteristics are therefore, potentially important at all stages of the creativity and innovation processes. Do organisations recruit, train or develop, manage, reward and recognise for creativity and cognitive style and if so, what is the basis of selection or development process?

Intrinsic and synergistic extrinsic motivation factors are extended to include contextual influences, yet the role of personality characteristics, has tended to pale in significance. The importance of personality characteristics to creativity are well documented (e.g. Barron and Harrington 1981; Mumford and Gustafson 1988) and interactionist models incorporate cognitive and personality characteristics either as multiplicative or mediating components (e.g. Woodman, Sawyer et al. 1993; Amabile 1996; Sternberg and Lubart 1996). However, the absence of research that investigates all major components of the interactive models, including individual as well as social and organisational factors, fail to recognise the relative significance of the interaction of the major components.

Although strategy, structure and culture must be important components (Amabile 1983; Sternberg 1985a; Woodman and Schoenfeldt 1989; Sternberg and Lubart 1991; Sternberg and Lubart 1992; Woodman, Sawyer et al. 1993; Sternberg and Lubart 1995; Amabile 1996; Sternberg and Lubart 1996) it is rare that they are investigated at this level. Most studies report having clarified what is deemed 'creative' with senior management although rarely is there an attempt to relate this to strategy

or culture and rarely is this detailed in individual reports. However, it is clearly important to identify support for creativity and innovation at this level as well as to determine what an organisation perceives and values as 'creative' in relation to its needs and requirements in terms of achieving strategic goals. The final research question addresses this:

RQ3: Are relative contributions of psychological, social and organisational factors moderated by the meaning and value of creativity in the organisation?

Social and organisational factors represent major components of the interactionist models on the basis that they might facilitate or inhibit both the level and frequency of individual creative behaviour. Amabile's componential theory of creativity (Amabile 1983; Amabile 1996) proposes three broad organisational factors, each of which comprise specific elements: 1) Organisational orientation towards innovation and supports for creativity and innovation, including attitude to risk taking and encouragement of creativity at the level of the organisation, supervisor and work group. 2) Resources available. 3) Management practices, including autonomy, challenge etc. (Amabile, Coon et al. 1996). It is at this level that the majority of research on the interactionist approaches is evident and a growing body of literature provides support for specific elements such as supervisor support for creativity and presence of creative co-workers, for example. However, as with the individual perspective, the relative emphasis on specific elements of the social and organisational factors rather than on the main components leads to ambiguous evidence that does little to advance the understanding of creativity or to support theory that might reliably inform practice. Only by including all major components of the interactionist models in an investigation can theory be advanced to reliably inform practice.

The very complexity of interactionist approaches to the study of creativity poses difficulties for empirical investigations at the level of specific sub-

components and elements that is useful neither to enhancing theoretical understanding nor to helping business/work organisations decipher, make sense of nor realise practical implications arising from such studies. On the other hand, the innovation literature fails to capitalise on the importance of organisational support in idea generation and the close relationship with social validation. Therefore, there is a clear need to develop a model of creativity and innovation that is of sufficient complexity to recognise the critical components of both yet with sufficient parsimony to be useful to the integration of creativity and innovation within established organisations. Further, regardless of their complexity, interactive approaches still fail to differentiate between novelty and value, nor specify type of creativity. Neither are interactive approaches sufficiently flexible to allow investigation of what it really means for an organisation to be creative or innovative or how best this might be achieved in context (e.g. Storey, 2000)? Meaning should represent a direct influence of organisational climate for creativity and innovation and link to type of creativity, value as well as being closely associated with intrinsic motivation that forms a major factor in Amabile's (1983, 1996) componential model of creativity.

In summary, this thesis aims to provide unique insight by investigating the contribution of major interactive components of creativity and innovation conceptualised in the creativity and innovation literatures, including, psychological and organisational climate, intrinsic and synergistic extrinsic motivation, personality characteristics and, importantly, what it means in practice for an organisation to be creative and innovative. Through systemic empirical investigation of individual, social and organisational components, differentiation between creativity and innovation processes, and an exploration of meaning and values, the main aim of this investigation was to extend knowledge and understanding of how business organisations might successfully stimulate, support and sustain organisational creativity and innovation, turning rhetoric into reality.

Chapter 3: Methodology

Previous chapters emphasise the main unique insight of this investigation as a systemic empirical investigation of interactionist models based on major individual, social and organisational components rather than various individual combinations of limited ranges of elements. Specifically, the contribution of components is explored. Individual factors include personality and cognitive characteristics relative to creative thinking skills, and intrinsic motivation. Social and organisational factors include qualitative analysis of meaning and value of creativity and innovation within the organisational context and how elements of the organisational climate support or inhibit creativity. Differentiation is made between creativity (idea generation) and innovation (implementation) on the basis that these represent very different processes each of which are likely to be facilitated by different components. Empirical investigation at this level is rare as is differentiation between stages.

3.1 Research strategy

Systemic investigations of this type demand a multiple case study strategy involving in-depth analysis of a contemporary phenomenon within a real-life, complex social context using multiple sources of evidence. Importantly this allows analysis at the level of intricacy demanded for the purpose of the work in hand. For this investigation, the adoption of a research strategy that employed multiple case studies allowed comparisons based on the contribution of and interaction between the main components within specific environmental contexts at the necessary level of intricacy.

To maximise reliability of outcomes the main criteria for inclusion were organisation size and the aspiration towards creativity and innovation, regardless of whether or not this was achieved in practice. Small-to-medium size companies took part, including two highly autonomous UK

subsidiaries of multinational organisations (8 – 150 employees). It was originally considered that micro organisations with less than 30 employees, whilst entrepreneurial, needed to focus primarily on operations and survival, providing a limited social context on which to base an analysis of organisational climate. One such company makes a very valuable contribution to this investigation. Another represents an autonomous subsidiary of a MNC that has undergone significant downsizing in recent years. On the other hand, medium to large companies frequently represent more established organisations where institutionalised routines and inertia add further dimensions to the already complex social context and are more likely to present barriers to creativity. Therefore, the small-to-medium sized companies included in this investigation provide an appropriate social environment that is neither too large nor too small for meaningful analysis and interpretation in order to meet the aims and objectives of this investigation. Further justification is provided by the call for greater creativity in UK SMEs discussed in the introduction to this investigation (Cox 2005; DTI 2005) and the suggestion arising from recent research that SME organisational size has a significant effect on innovation incorporation in relation to leadership, people and culture and knowledge and information management (McAdam, Reid et al. 2004).

As far as it can be determined, no previous studies have attempted such comparison. Further, the fragmentation of broad components by previous researchers prevents a meta-analysis for comparative purposes. The main value of this work resides in the systemic approach to an investigation of the contribution and interaction of main factors identified as facilitating organisational creativity. Additional unique insights suggest differentiation between originality (creativity) and value (implementation) and by exploring the meaning of creativity and innovation to organisational members. In this way, this study aimed to advance the theoretical and practical understanding by developing a model of sufficient complexity to include the contribution of critical components yet with sufficient parsimony

to be meaningful and useful to the integration of creativity and innovation within work organisations. This has direct implications for the theory and practice of organisational behaviour, human resource management, human resource development and other disciplines interested in stimulating, supporting and sustaining creativity and innovation.

Through in-depth multiple case studies of SMEs of various sizes informative comparisons were made at the necessary level of intricacy between the contribution and interaction of individual and social components across different organisational environments. Approaches to individual cases might be holistic or embedded. Holistic investigations examine the global organisation while embedded investigations allow for differences between subunits. This investigation adopted a holistic design, although differentiating between departments where appropriate depending on total number of employees and sample size. Empirical investigations of this type are rare largely due to the complexities of studies at the level of the system and the necessary depth of analysis. For the same reasons it is necessary to limit the number of companies in this investigation.

Each individual case can represent a significant contribution to knowledge and theory building. External validity of a single case is addressed through the use of theory, which specifies a clear set of propositions as well as the circumstances in which these are believed to be true (literal replication) and is appropriate to testing and extending the theory in order to provide support or to suggest alternative explanations that advances existing theory (Yin 2003:40). Construct and internal validity are achieved through the use of reliable and valid measures and multiple data sources to establish a chain of evidence, and rigorous data analysis, respectively (Yin 2003:47). Reliability is achieved through the identification of a critical or typical case employing multiple methods of data collection. The logic of a multiple case study strategy is theoretical replication and every case serves a specific purpose, in pursuit of different patterns of theoretical

replication and extension (Yin 2003:47). Suitable organisations for inclusion in the sample were identified through contacts at the University of Bedfordshire (formerly University of Luton) and mailing lists selected using databases held by the Luton and Dunstable and Milton Keynes Chambers of Commerce. This thesis reports on findings based on eight in-depth case studies of SMEs conducted across two main stages between 2005 and 2008.

3.2 **Stage 1**

The first stage of this study originally proposed case-studies of two small to medium enterprises (SMEs) one known for successful creativity and innovation and the other less so, based on Yin's (2003) replication approach to multiple case studies. Eight local SMEs, identified through the Luton and Dunstable Chamber of Commerce for potential participation based on their aim to be creative or innovative, were contacted initially by letter in early Spring 2005 and followed up approximately two weeks later by telephone. The participation of another organisation was requested based on existing contact with the University of Luton (University of Bedfordshire w.e.f. August 2006) and the obvious efforts of this company to be creative. Two companies agreed to participate in the initial stage of this investigation.

Initial meetings were arranged with the Chief Executive of Company 1 and the Managing Director of another company in early spring 2005. The purpose was to conduct semi-structured interviews and to elicit personal constructs based on the repertory grid technique, the objectives of which were to begin to uncover what it means to be creative or innovative for these individuals in the context of their respective organisations. Each meeting lasted between one-and-a-half and two hours including agreement to interview another member of management and for questionnaire completion by a small sample of staff. Unfortunately, the second company withdrew from the investigation. It was not possible to arrange the participation of another organisation and, therefore, findings

for the initial stage are based on an in-depth case study of Company 1 only. The participating company is that which demonstrates clear efforts to be creative and had existing contact with the University of Bedfordshire.

A semi-structured interview and personal construct elicitation was conducted with a second member of management in Company 1 in July 2005. At the same time, questionnaires were left with the Chief Executive for distribution to the agreed sample of staff. Arrangements were made for collection two weeks later. The intricacy of interactions concentrated in one company that has mechanisms in place to manage the creativity and innovation processes is of great value as a first stage of the current investigation in understanding the facilitation of creativity and innovation and to informing theory and practice.

3.2.1 Data Collection Methods

Within organisations the actual meaning of the injunction to be creative and innovative, the priority that should be accorded to it, the ways in which the organisation would need to behave to facilitate this objective and the types of innovation deemed to be required clearly underpin its application in practice. Successful incorporation into the organisation demands that management's vision and drive must be focussed on creativity and innovation (McAdam, Reid et al. 2004). In order to gain rich insight as well as to bring out the critical socio-political factors involved in idea generation and exploitation, semi-structured interviews were employed to investigate meaning given to creativity and innovation by management within their organisations. Interviews also served to obtain details of salient organisational factors not available elsewhere. Focus groups were considered appropriate to gain insight into the interpretations of various key organisational members although these were not practically feasible. During the interviews details were requested about creative behaviour of employees and implementation of innovative outcomes, whilst ensuring that no names or other personal identifiers were used. Depending on organisational size and the number of employees from whom data was

collected, where appropriate management were requested to provide sets of pre-coded questionnaires to specific individuals perceived as displaying 'creative' or 'innovative' behaviour. Questionnaires were returned directly to the researcher via an organisational contact so no identifiable or individual data was revealed to the organisation. This allowed a comparison of outcomes based on individual and management reports and analysis of how these might interact with individual and social factors.

3.2.2 Interviews and Repertory Grids

In order to gain rich insight as well as to bring out the critical socio-political factors involved in idea generation and implementation, semi-structured interviews were used to investigate meaning of creativity and innovation with two members of management. Meanings and perceptions are socially constructed and in order to overcome problems of espoused opinions the repertory grid technique (Kelly 1970) was employed to elicit personal constructs of creative outcomes and people, avoiding researcher bias (Jankowicz 2004).

3.2.3 Questionnaires

Respondents were provided with four questionnaires for completion, each set identified using the KEYS six digit code so that responses could be correlated between instruments whilst ensuring respondent anonymity.

KEYS Assessment of Creative Climate

Based on Amabile's (1983; 1996) componential theory of creativity, KEYS Assessment of Creative Climate was designed and validated to assess perceptions of all the work environment dimensions suggested as important in empirical research and theory of creativity in organisations (Amabile, Coon et al. 1996). The scales of KEYS assess stimulants and obstacles to creativity based on the dimensions of organisational, supervisory and work group encouragement, autonomy, resources and pressures and distinguish between high and low creative environments, and have demonstrated acceptable levels of reliability and validity. The relevance of KEYS to the proposed study is that it provides an empirically

based and validated means of assessing important organisational determining elements and broad components of creativity. KEYS was designed to assess perceptions of all of the work environment dimensions that have been suggested as important in empirical research and theory on creativity in organisations based on the underlying assumption that self-report responses reveal respondents' perceptions – the psychological meaning that respondents attach to events in their organisation (Amabile, Coon et al. 1996).

The KEYS survey (Amabile, Coon et al. 1996; Amabile, Burnside et al. 1999) is a reliable and valid measure of elements in the work environment that can have an impact on creativity on the assumption that people can and will honestly report their perceptions, which may or may not correspond with perceptions of observers. The perceived work environment as experienced by the individual staff members is likely to be the crucial influence on the creative behaviour of those individuals. Statistical analysis and psychometric properties of the survey are published (Amabile, Coon et al. 1996). KEYS is reportedly suitable for use in organisations of any size and analyses are meaningful with teams as small as three people or with groups as large as several hundred people (Amabile, Burnside et al. 1999). The survey includes 78 items that comprise 10 independent item scales, of which 8 are work environment scales including 6 environmental stimulants to creativity: *Organisational Encouragement*, *Supervisory Encouragement*, *Work Group Support*, *Challenging Work*, *Freedom*, *Sufficient Resources*; and 2 environmental obstacle scales: *Organisational Impediments*, *Workload Pressure*. The remaining two scales are criterion measures that describe perceptions of the outcomes in terms of *Creativity* and *Productivity* of the work carried out. The work environment scales group into three tiers based on the strength of differentiating factors between high and low creativity environments and analysis of the KEYS scale items are presented on this basis.

TIER 1

- *ORGANISATIONAL ENCOURAGEMENT* (STIMULANT SCALE): An organisational culture that encourages creativity through the fair, constructive judgement of ideas, reward and recognition for creative work, mechanisms for developing new ideas, an active flow of ideas and a shared vision of what the organisation is trying to do.
- *WORK GROUP SUPPORT* (STIMULANT SCALE): A diversely skilled work group, in which people communicate well, are open to new ideas, constructively challenge each other's work, trust and help each other and feel committed to the work they are doing.
- *CHALLENGING WORK* (STIMULANT SCALE): A sense of having to work hard on challenging tasks and important projects.

TIER 2

- *SUPERVISORY ENCOURAGEMENT* (STIMULANT SCALE): A supervisor who serves as a good work model, sets goals appropriately, supports the work group, values individual contributions, and shows confidence in the work group.
- *FREEDOM* (STIMULANT SCALE): Freedom in deciding what work to do or how to do it. A sense of control over one's work.
- LACK OF *ORGANISATIONAL IMPEDIMENTS* (OBSTACLE SCALE): An organisational culture that impedes creativity through internal political problems, harsh criticism of new ideas, destructive internal competition, an avoidance of risk and an over emphasis on the status quo.

TIER 3

- *SUFFICIENT RESOURCES* (STIMULANT SCALE): Access to the appropriate resources including funds, materials, facilities and information.
- (LACK OF) WORKLOAD PRESSURE (OBSTACLE SCALE): Extreme time pressures, unrealistic expectations for productivity and distractions from creative work.

Section II of the survey asks respondents to choose from presented lists the *single* most important stimulant and obstacle to creativity and one suggestion for improving the climate for creativity in their workplace.

NEO-FFI of Personality Dimensions

The NEO Five-Factor Inventory features individual differences important to workplace performance and has been used to investigate the relationship of personality to many important organisational variables, including creativity and divergent thinking. The five dimensions comprise *Openness to experience*, *Conscientiousness*, *Extraversion*, *Agreeableness* and *Emotional stability*. *Conscientiousness* (persistent, responsible, hardworking, conformist) and *Emotional stability* (vs. neuroticism) are important to most jobs. *Openness to experience* (curious, broad-minded, cultured and intelligent) is important to training proficiency and creativity. *Extraversion* and *Agreeableness* are important to occupations where interpersonal relationships are crucial to success. Studies that have attempted to investigate personality in relation to specific elements of the interactionist models have provided support for the *Openness* and *Conscientiousness* dimensions of the five-factor model of personality respectively in facilitating and inhibiting creative behaviour. The Five-Factor Model of personality has been validated by organisational psychologists (Wiggins and Trapnell 1997) and is considered to feature individual differences important to workplace performance.

To avoid excessive demands on participants, shortened versions of existing measures of personality and cognitive characteristics were employed, based on the five-factor model (Costa and McCrae 1985; 1992) of personality and Sternberg-Wagner Thinking Styles Inventory (Sternberg 1997). Both measures have demonstrated characteristics important to creative behaviour. The NEO Five-Factor Inventory (NEOFFI) represents a short version of the NEO-Personality Inventory (Costa and McCrae 1992) that has been shown to reliably measure these five personality dimensions (Courneya and Hellsten 1998; Saucier 1998). The Sternberg-Wagner self-

assessment inventories on thinking styles (SWSAITS) comprise 13 'inventories' based on individual thinking styles that can change over time based on experience and goals to be achieved and differ from personality traits in that they reflect cognitive preferences, how individuals think about or deal with problems and tasks (Sternberg 1997).

Supplementary Questionnaire

A supplementary questionnaire (SQ) was compiled specifically for the purpose of this investigation to provide an important means of obtaining demographic and outcome data. Items included innovative culture and communication at the company level (Yap, Chai et al. 2005); creativity-oriented behaviours of problem recognition and idea generation and innovation-oriented behaviours of idea promotion and realisation based on Janssen's (2000) innovative work behaviours and adapted from a previous investigation (Dorenbosch, van Engen et al. 2005); self-perception (Tierney and Farmer 2002), functional flexibility and commitment. All are suggested (see Chapter 2) as important to the facilitation of creativity and innovation. Combination of quantitative analysis derived from KEYS together with qualitative data derived from interviews leads to meaningful interpretation through triangulation of methods of data collection and research approaches.

Sternberg-Wagner Self-Assessment Inventory on Thinking Styles (1997).

SWSAITS comprises 104 statements divided between thirteen inventories each including 8 items and based on different thinking styles. This inventory was employed in the pilot stage with Company 1 but discontinued thereafter as it failed to add value. Analysis of this measure revealed no significant relationships with any of the other measures used, including outcomes and, therefore, this was excluded from the remainder of the analyses and was not employed in subsequent cases. See Appendix A for examples of all questionnaires.

Development to Stage 2

Stage 1, essentially a pilot study based on an in-depth investigation of a single case study, was very successful in reinforcing the feasibility and utility of this investigation. Therefore, this formed a solid foundation for development to Stage 2 based on a research strategy that employed multiple case studies to allow comparisons based on the interactions of the components of the interactionist models between SMEs of various sizes. In particular, it was important for informative comparisons to be made between contributions of components of the individual, including personality characteristics relative to creative thinking skills and intrinsic motivation, within different social and organisational environments. Stage 1 served to highlight the intricacies of these models and identification of potentially important differences was possible through an in-depth, single case-study approach of this type. Multiple data sources clearly suggested implications for shared understanding that did not pervade the entire organisation, differences being apparent between members of the management team and staff, even in an organisation aspiring to be supportive in stimulating and sustaining creativity and innovation.

Stage 2 extended the research to build on the findings and to address aims and objectives that were not possible in stage 1. Lack of shared meaning was one such area and it was important to extend this to elicit perceptions of creativity as distinct from innovation. It was also deemed important to extend this to questionnaires so that workforce perceptions of meaning were incorporated in relation to factors arising from management interviews and academic literature. Intuitively, shared meaning might contribute to the interactionist models as a moderating or an intervening variable.

Objective outcome measures for creativity and innovation are problematic and, whilst the retrospective estimations used in this investigation might not have been ideal, they have proved very informative. However, additional data sources were necessary to add to the reliability of these

measures. In stage 2 supervisor and line manager assessments were obtained in addition to self-reports of the extent to which individuals were perceived as creative or innovative. It was also informative to obtain data on reasons for non-implementation of creative ideas in relation to meaning, value, type, priority, power relations and cost, for example.

The appropriateness of a holistic or an embedded design of multiple case studies (Yin, 2003:40) must be context dependent based on employee numbers and organisational structure, for example. The findings from Company 1 might have reflected the lack of available studies on the impact of teamwork on individual creativity, in respect of which limited studies provide mixed findings as to the facilitation or inhibition of creativity by teamwork (Egan 2005; 2005b). Prompted by the complexity of the findings it was necessary to differentiate between various groups of individuals or departments and to employ larger sample sizes taking into account sub-groups of the organisations. Stage 1 of this investigation, which adopted a holistic design, employing a purposive sample, demonstrated the need to differentiate between different units of analysis. Therefore, for companies participating in stage 2, an embedded design allowed differentiation at the level of departmental groups. This was possible in three of the seven cases, but prevented in the remaining four by size or structural limitations.

The contribution of appropriate individual characteristics needed further investigation and, whilst KEYS assesses aspects of creative climate such as *Supervisor encouragement* and *Work Group Support*, there was a need to extend knowledge and understanding of collective creative idea generation and implementation through the identification of these factors in facilitating organisational creativity and innovation. Measures intended to tap organisational learning, knowledge management and information sharing appear to overlap with KEYS although the relationships appear complex and it was important to adapt these for stage 2 of this investigation.

Stage 2 comprised seven in-depth case-studies of SME's (8><150) including those who are more successfully creative and innovative and others somewhat less so, based on the replication approach (Yin 2003) to multiple case studies. Participants for Stage 1 were educated knowledge workers, in this case including a large proportion of scientists. It was important that organisations identified for participation in stage 2 were similarly educated knowledge workers, although not necessarily scientists. Detailed and meaningful comparisons were planned for interactions between individual, social and organisational factors that would inform the development of a model of academic and practical significance to organisations in the facilitation of creativity and innovation.

In this way, it was possible to investigate the multiplicative contribution of the major factors that suggests creativity is most effectively facilitated through the interaction of high creativity relevant personality characteristics and skills with a supportive creative climate. For example, it has been suggested that high creative climate and low creativity characteristics is unlikely to effectively facilitate organisational creativity and innovation due to a lack of idea generation. On the other hand, a highly creative individual in a climate that does not support creativity will either inhibit creativity or lead to ideas that are not sufficiently valued for implementation in a given context (Amabile 1996; 1997). However, intuitively such assertions may not stand up to available evidence, as suggested by studies undertaken to date and as reviewed in Chapter 2. Importantly, the ultimate aim was to develop a model for the facilitation of creativity and innovation in organisations highlighting the implications for integration with HRM in general and HRD in particular.

Two of the companies identified for inclusion in stage 2 were contacted by direct mail followed up by telephone calls; another two through university contacts and the final three volunteered in response to an article in an electronic mailing of companies through the University of Bedfordshire's Knowledge Hub. Contact by direct mail amounted to hundreds of

companies, with a disappointingly low take-up rate, regardless of the potential benefits to organisations of participation. For example, rapid diagnostic feedback of the climate for creativity and, on completion of the research, an executive summary of the findings based on all participating companies. This investigation has continuously highlighted the difficulties for organisations in aspiring towards creativity and innovation and, from this perspective, the low take-up might be considered surprising. However, of much greater significance is the implication that many organisations failed to appreciate the relevance of creativity to their companies, often reinforcing the common misconception that creativity and innovation are only relevant to those responsible for aesthetics such as design, or those in the research and development function. From difficulties experienced with sampling it is evident that many companies still regard creativity and innovation as irritants that get in the way of 'real work', as suggested by Basadur and Gelade (2006:61).

Regardless of such difficulties, this investigation has succeeded in gaining the valued participation of eight organisations. All meet the criteria of aspiring to creativity and innovation to varying degrees and all meet the criteria of size based on employee numbers, including one micro organisation (<30 employees) and two subsidiaries that operate autonomously from their respective parent companies. One of the subsidiaries currently employs approximately 33 staff following downsizing in recent years. Two companies engage in scientific research and three companies are closely allied to marketing. All of the companies in this sample are relatively non-hierarchical. Brief details of the sample of companies are given in Table 10.

Table 10 Summary of sample of companies

Co.	Details	Sector	Size (Employees)	Respon--dents	Holistic/ Embedded
1	Scientific research Drug surveillance	Service	130	30 (30)	Holistic (Pilot)
2	Business Improvement (European subsidiary)	Service	120	63	Embedded 8 Departments Wide variation
3	B2B Marketing	Service	90 (40)	30 (40) knowledge workers	Embedded 3 Departments Operations same Admin varies
4	Research Laboratory (European subsidiary)	Manufacturing	33	27	Holistic (no divisions)
5	Engineering	Manufacturing	45	24	Embedded 4 Departments Wide variation
6	Corporate Communications	Service	25	15	Holistic (low response)
7	Accountant	Service	8	6	Holistic
8	Charity	Service	150	15 (35) Care home and central managers	Holistic (low response)

The focus of this investigation is on facilitating organisational creativity and, therefore, is concerned primarily with intrapersonal individual factors (e.g. intrinsic motivation, creativity relevant skills, personality) and interpersonal factors (team work, leadership, organisation of work) within specific organisational contexts. Climate for creativity is an aggregate measure of individual perceptions, and elements of climate are concerned with organisational attitudes, procedures and management policies and practices that stimulate and support creativity. Creative ideas might lead to radical innovations or incremental improvements, in respect of which some

elements (e.g. risk, taking, freedom) are deemed more important than others (Ekvall 1996). However, as this investigation is concerned with creativity rather than innovation, the focus on individuals and social interactions in work organisations overcomes contextual limitations such as sector, structure, and other organisational characteristics suggested as significant to innovation.

Data is analysed at multiple levels. In respect of the first set of outcomes, estimations of ideas generated and implemented, analysis is based on the entire sample of individuals across companies. In respect of the interactive contribution of elements of climate and personality characteristics, Model 1 reflects variance between companies. Models 2-4 present alternative models based on personality characteristics and are again based on all participants rather than company specific. In this way, this investigation adopts a multilayered approach that fulfils the aims and objectives of developing models of practical and theoretical significance and explores the implications of how HRM and HRD support the development of a climate for creativity. This is evident from resulting models and the discussion of model fit that highlights the virtuosity of the diverse sample.

3.2.4 Further adaptations in Stage 2

While recognised as a highly useful technique, analysis of data elicited through the Repertory Grid technique for the first two companies appeared to add little of value to the outcomes of this investigation. Administration of this technique places excessive demands on time for little gain and, therefore, its use was discontinued.

The Supplementary Questionnaire (SQ) included additional items on innovative culture and communication, innovative work behaviours, functional flexibility, commitment, organisational learning and knowledge management. While arising from Stage 1 there was some indication of overlap with other measures these items were retained to maintain

consistency between multiple cases as far as possible. However, these placed unnecessary demands on participants and added little if any value to the outcomes. Therefore, these items were removed from the SQ for Companies 4-8.

Chapter 4: Analysis and Findings

This chapter represents a major section of this thesis in reporting data analysis and findings based on eight in-depth case studies of participating companies. Initial analysis explores qualitative interview data alongside quantitative diagnosis of the climate for creativity, as measured by KEYS (Amabile, Burnside et al. 1999), and personality characteristics, as measured by the NEO-FFI (Costa and McCrae 1992) within the context of each case. The next stage of the analysis utilises the total sample of 209 participants across all companies to investigate associations of individual, social and organisational factors with the first set of outcome measures, individual and group idea generation and implementation. Subsequent analysis compares companies in respect of stimulants and obstacles to creativity, and personality characteristics, leading to the development of a general linear model for factors contributing to organisational creativity. Qualitative comparison of similarities and differences between companies attempts to explain additional variance.

4.1 **Stage 1**

4.1.1 Company 1: Background

This is an in-depth case-study of a quasi-government controlled institution that claims to be the UK's pre-eminent sports drug surveillance and pharmaceutical contract research organisation, at the time of data collection employing approximately 130 staff across a three-layer structure comprising directors, management and team leaders. At that time (2005) the Chief Executive had joined less than four years previously and was committed to achieving organisational effectiveness and competitiveness within a rapidly changing business environment. At the time of writing (2008) the company had recently privatised and staff number 150 and still increasing. Staff members work closely together within an environment where creativity and teamwork are highly valued and where mechanisms are in place to harness creative energies. Hence the company presented

an excellent context in which to explore the intricacy of interactions for the major factors facilitating organisational creativity.

4.1.1.1 Case Study Sample

A purposive sample was employed for each of the methods of data collection, comprising two managers for semi-structured interviews, including the elicitation of repertory grids, and 30 staff across levels, functions, roles and tenure, including management for completion of the questionnaires.

4.1.1.2 Summary of Interviews and Repertory Grids

The initial meeting with the Chief Executive served the conduct of a semi-structured interview and personal construct elicitation based on the repertory grid technique. This interview (see Appendix B for full transcript) reinforced the very high priority and high value of creativity and innovation supported through a systematic approach and structured mechanisms, including Creativity and Innovation clubs to which participants bring practical issues and apply appropriate creative problem solving techniques. The Board of Directors also use the club as a mechanism to 'crack open' representations of strategic issues that might then be discussed at the Innovation Club. The sessions are useful for immediate and strategic problems but serve a dual purpose in training staff in creative problem solving techniques, breaking down the barriers to creative thinking, identifying the blocks and learning how these might be overcome. Additional creative problem solving sessions might be facilitated by managers more locally, as necessary. Mechanisms are also in place for the recording of all ideas generated that are actively managed for future reference.

A second semi-structured interview and personal construct elicitation was conducted with a Section Manager in Research and Development (see Appendix B for full transcript) who had been with the company for almost twenty years and had first-hand experience of the oppression of former

management compared with major changes since the current CE joined the company. To quote this manager,

> "He was just like a breath of fresh air. After you've been hammered for five years then you realise you are free to say anything to him and he would listen to what you say." (Company1.2.44).

In the aim of becoming more empowered and entrepreneurial, staff had begun to be more open and a very positive attitude is apparent. There was no hesitation in suggesting that creativity means the freedom to try out new ideas in a safe environment without the fear of humiliation or intimidation.

Analysis of personal constructs elicited through the repertory grid technique for both interviewees demonstrated overlap between the constructs *radical--incremental* and *high value--low value,* clearly suggesting a close association between value and type of creative outcomes. However, these associations appear reversed so that radical is highly valued for the CE whilst incremental is highly valued for the R & D Section Manager. This clearly suggests differences between hierarchical levels in terms of what it means for the company to be creative and innovative. Three elements considered insufficiently creative for implementation, were construed by the CE as *incremental/low-value.* Differences in meaning are further apparent through analysis of constructs based on a common element, which the CE construes as motivational, the R & D Section Manager, in terms of cost. Principal components analysis for the latter identifies *incentivised* and *quantifiable* as the main constructs. Personal constructs elicited from the second of the repertory grids, relating to creative people, were very different for each of the interviewees. Such differences might be interpreted as representative of relative hierarchical level. Recognition and understanding of such differences are important in any attempt to disseminate shared meaning between organisational members.

4.1.1.3 Questionnaires

Of 30 questionnaires distributed 29 were completed and returned two weeks later using envelopes provided to maintain confidentiality.

Supplementary Questionnaire (SQ)

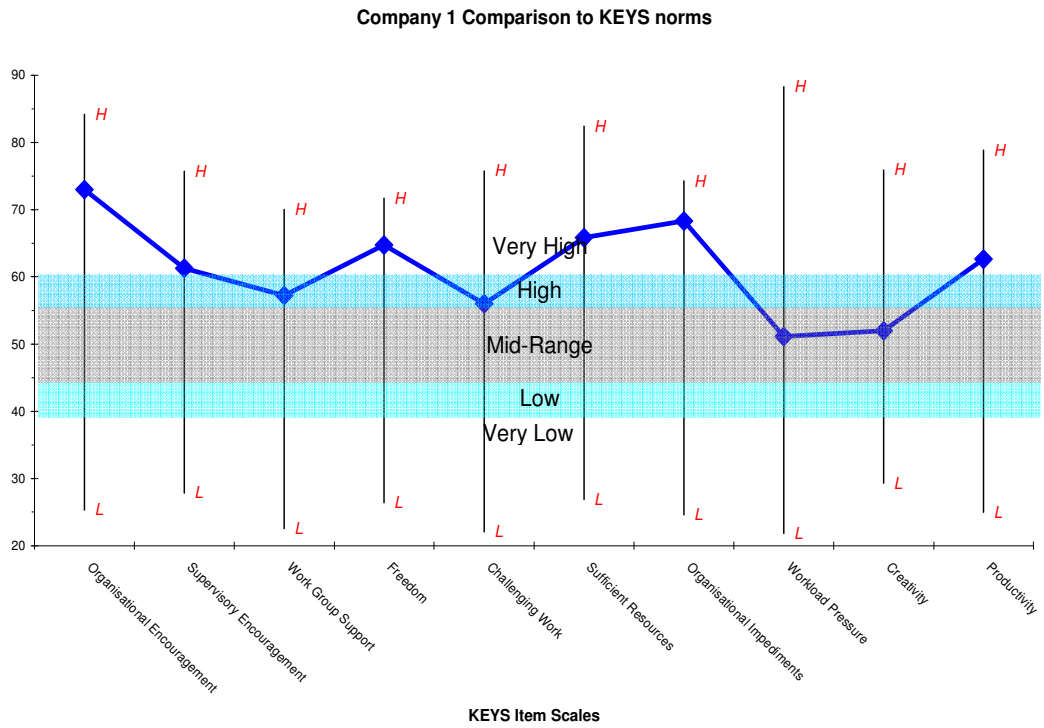
Of this sample, 79 percent were aged 26-45 years and more than half had joined the company in the previous 4 years. Participation in creativity training was reported by 72 percent of respondents, 62 percent with this company. Outcome measures requested were estimates of the number of creative ideas generated and implemented, individually and collectively, over the previous two years. To avoid influencing responses, categories were not predefined. For individual ideas and implementation, the majority of estimates (70% and 81% respectively) were fewer than 10 and almost all were fewer than 30. For group ideas and implementation more estimates fell into the range 11-30 than for individual outcomes. Again, almost all estimates were fewer than 30.

*KEYS: Assessing the Climate for Creativity (*Amabile*, Burnside et al.* 1999*)*
Respondents' perceptions both of the *Organisational Encouragement* and *Organisational Impediment* scales are very positive. Somewhat less positive responses were apparent for the former in respect of reward and recognition for creativity, risk taking and acceptability of failure. For the latter strict control by upper management and negative criticism attracted less positive responses. The *Supervisory Encouragement* scale was perceived very positively with the exception of items concerning the setting of overall goals and constructive feedback. The *Work Group Supports* scale was again responded to very positively with the exception of the constructive challenging of ideas within the work group. Responses to items comprising the *Freedom, Challenging Work, Sufficient Resources* and *Productivity scales* were all extremely positive. (Lack of) *Workload Pressure* represents an obstacle to creativity scale to which far less positive responses were reported. For example, 62 percent of respondents perceived they often or always had too much to do in too little

time and 79 percent reported often or always feeling a sense of time pressure in their work. Reported perceptions of items comprising the *Creativity* criterion scale were also less positive than for other scales.

Conversion of data to standard scores allows comparison to the database of all companies that have used the instrument based on scale means in overcoming problems of disproportionate weighting of companies with large numbers of respondents. Figure 4-1 clearly illustrates the favourable positioning of this company relative to the KEYS database, with the exception of the *Creativity* criterion scale and the *Workload Pressure* obstacle scale.

Figure 4-1 Company 1 Comparison to KEYS norms



For the *Workload Pressur*e scale, based on extreme time pressures, unrealistic expectations for productivity and distractions from creative work, the three least positive items concern having too much to do in too little time, unrealistic expectations and feeling a sense of time pressure. The *Creativity* scale represents a criterion measure of creative climate. Specific items include respondents' perceptions of their area of the

organisation as creative or innovative, that a great deal of creativity is called for in daily work, a belief that they are currently very creative in their work and that the work environment is conducive to their individual creativity and that of their work group.

Whilst one interpretation might be that not all individuals, roles, tasks or departments call for creativity and innovation, this is unlikely to be the case in an organisation where creativity and teamwork are highly valued. The company web site demonstrates this,

> "Everyone at Company 1 is involved. It's a team effort.", "We're open, accessible, and transparent. Welcome to Company 1." and "Creativity and innovation lie at the heart of the Company 1 culture. The Creativity and Innovation Clubs provide an environment for the free exchange of ideas, to push the boundaries and to harness the collective energies of the people that make up Co. 1".

An alternative interpretation might be that some staff, or departments, lack an awareness of how creativity can successfully be applied across all levels, functions and roles and in all areas and departments of the organisation to the extent that individuals fail to realise how creativity could potentially enhance their work. Despite the creative revolutions (Gibb & Waight, 2005) one cannot assume that the workforce realise that creativity can be generated in any job and at any level of the organisation not just in jobs that are traditionally viewed as necessitating creativity (Madjar et al, 2002). Therefore, it is suggested that while there is an awareness of creativity at the heart of the organisational culture, some staff lack an awareness of what this means to them personally in practice in relation to their own work.

Greater understanding of how this might translate to be personally meaningful and how this could be applied at the individual or departmental level might be necessary particularly in an organisation that largely

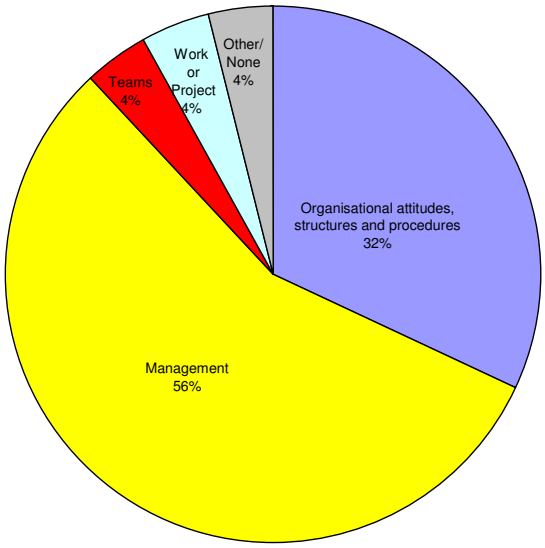
comprises a high proportion of scientists. Training staff in creative problem solving techniques, breaking down the barriers to creative thinking, identifying the blocks and learning how these might be overcome is clearly very useful to the facilitation of organisational creativity. Perhaps the need for further training becomes necessary for some staff in identifying problem areas to which these might be applied so that the utility of such techniques might be enhanced. Clearly this is also becomes very relevant to the notion of shared meaning of what it means in practice for an organisation to be creative and innovative.

Section II: Checklist items

Section II of the KEYS survey includes three additional checklist questions that ask participants to choose the single most important factor supporting, inhibiting and to improve creativity and innovation in the current work environment. Responses are illustrated in Figures 4-2, 4-3 and 4-4.

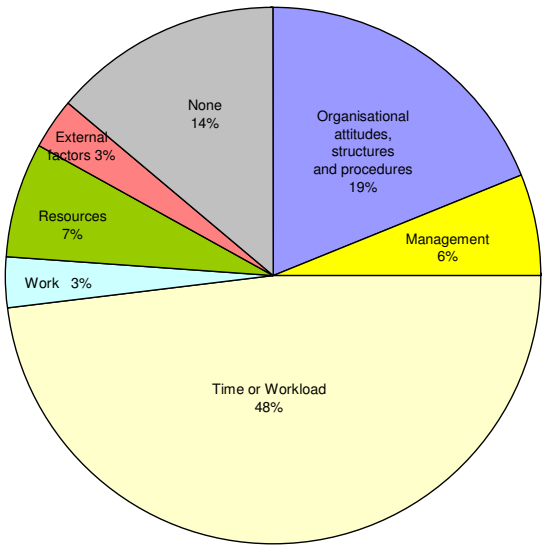
Across all three questions, factors reported by respondents most frequently fell into the categories of *Organisational attitudes, structures and procedures, Management* and *Workload Pressure* and considerable overlap exists with scales in Section I. For Section II B that asks respondents to identify the one factor inhibiting the climate for creativity in the organisation, almost half the respondents indicated time or *Workload Pressure*, 38 percent identifying insufficient time and 10 percent too much work.

Figure 4-2 Company 1: Most important factor supporting creativity and innovation?



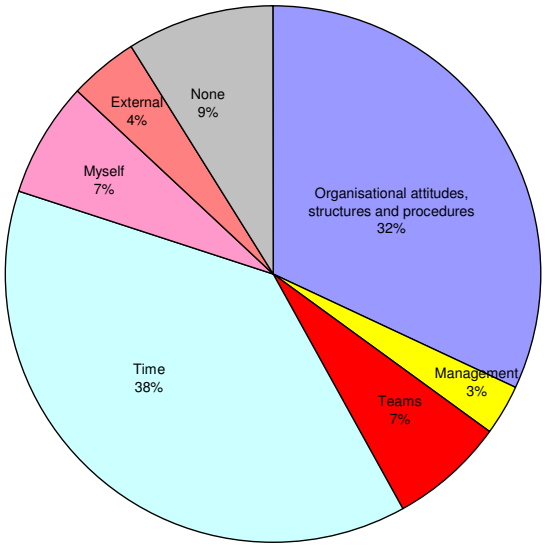
Organisational attitudes, structures and procedures		**Management**	
Mechanisms for developing ideas	14%	Clear vision	24%
Communication and collaboration around ideas	4%	Support from upper management	21%
Trust	7%	Support from immediate supervisor	7%
Openness to new ideas	7%	Other behaviours of management	4%
Work or Project		**Teams or Co-workers**	
Challenging Work	4%	Constructive debate	4%
Autonomy	4%		

Figure 4-3 Company 1: Most important factor inhibiting creativity and innovation?



Organisational attitudes, structures and procedures		**Management**	
Apathy	3%	Lack of support - supervisor	3%
Avoidance of risk	3%	Lack of support - management	3%
Rigid procedures	7%	**Time or workload**	
Lack of *openness* to ideas	3%	Insufficient time	38%
Lack of job security	3%	Too much work	10%
Work: Lack of autonomy	3%	**Resources:** Insufficient money	7%
External: Competitive industry	3%	**None**	14%

Figure 4-4 Company 1: Most important suggestion for improving the climate?



Organisational attitudes, structures and procedures		**Time or Workload**	
Better communication/collaboration around ideas	7%	More time for work	31%
Reward	4%	Less work	4%
Recognition	7%	More flexible work schedules	4%
Trust	4%	**Myself**	
Mentoring by senior creative people	7%	Personal characteristics	4%
Less fear of risk	3%	Ability	4%
Management: More support from upper management	3%	**External:** Better customer relations	4%
Teams: Constructive debate	3%	**None**	10%

For Section II C regarding the one factor that would improve the climate for creativity in the organisation, 38 percent again identified time or *Workload Pressure*, 30 percent indicating more time for work, 4 percent less work and 4 percent more flexible work schedules. For 30 percent of respondents, suggestions for improving the climate for creativity fall into the *Organisational attitudes, structures and procedures* factor, including mentoring by senior creative people, better collaboration, recognition and reward for creative work, which mirror less positive responses to

corresponding items on KEYS scales. Support of more creative co-workers has been shown to enhance creativity in those with less creative personalities, inexperienced individuals or those with less confidence (Madjar, et al, 2002; Zhou, 2003).

NEO Five-Factor Personality Inventory (Costa & McCrae, 1992)

The NEO-FFI comprises 60 questions using a 5-point scale from 'strongly disagree' to 'strongly agree'. Significant correlations between factor scores and respondents' estimations of creative outcomes suggests that *Openness to experience* correlates with both collective idea generation (r .407, $p<.05$) and collective implementation (r.474, $p <.05$), but not to idea generation or implementation at the level of the individual. A significant negative correlation exists between *Conscientiousness* and individual implementation (r -.456, $p <.05$). Significant relationships at the level of $p<.05$ were also found for *Agreeableness* and *Emotional stability* with collective idea generation and implementation, *Emotional stability* also demonstrating a significant relationship with the individual implementation.

The broad level factors deemed as antecedents to the facilitation of organisational creativity and innovation each comprise a number of components and resulted in the collection of data on a large number of variables. In order to address the aims of this investigation it becomes necessary to analyse relationships of these variables with outcome measures. Beginning with demographic variables, 28 percent reported as 'Upper Middle' their hierarchical level of the organisation and 35 percent 'Middle'. Reclassified categories demonstrate higher means for the upper levels of the organisation. ANOVAs for hierarchical level reached significance for individual implementation ($F=2.92$, d.f. 4, 20; $p<.05$), and almost achieved statistical significance for collective implementation ($F=2.75$, d.f. 4, 21; p .055).

Some 35 percent of participants reported an 'Administrative/ Management' function and 38 percent a 'Research and Development' function. Mean

comparisons for function suggest most ideas are generated individually and collectively in administration/management, followed by research and development and sales, and for implementation, sales have the lowest mean. However, ANOVAs revealed no statistically significant differences based on function.

Correlations between outcome measures (see Table 11) and item scales suggest highly significant relationships of the KEYS *Creativity* criterion and *Organisational Encouragement* scales with all four outcomes. The *Creativity* criterion scale represents a creative organisation where a great deal of creativity is called for and where people believe they actually produce creative work and, as such, is likely to overlap with creative requirement (e.g. Unsworth et al, 2002) and self-efficacy. *Organisational Encouragement* is a stimulant scale representing perceptions of an organisational culture that encourages creativity through the fair, constructive judgement of ideas, reward and recognition for creative work, mechanisms for developing new ideas, an active flow of ideas and a shared vision of what the organisation is trying to do. This scale represents important aspects of the creative climate deemed significant to the interactionist models (Amabile, 1983, 1996; Sternberg & Lubart, 1991, 1996; Woodman et al, 1993) and others (e.g. Scott & Bruce, 1996). Significant relationships were also suggested for all outcomes, except individual idea generation, with another stimulant scale, C*hallenging Work*, which represents a sense of having to work hard on challenging tasks and important projects. *Challenging Work*, together with personality characteristics, and supportive supervision was found to be an important determinant of creativity by Oldham & Cummings (1996), although, in this organisation, *Supervisory Encouragement* appears not to be significantly associated with any of the outcome measures.

Further significant relationships were found for the *Freedom* scale, representing autonomy in deciding what work to do or how to do it, and *Work Group Support* scales with both collective outcomes, although for

neither of the individual outcomes, which might be seen as supportive of the relationship of empowerment to creativity (Unsworth et al, 2002). *Work Group Support* represents a diversely skilled work group in which people communicate well, are open to new ideas, constructively challenge each other's work, trust and help each other and feel committed to the work they are doing. As such this scale might be seen to substantiate the significance of support to creativity demonstrated in previous studies (e.g. Madjar et al, 2002; Zhou, 2003). No significant relationships were found for *Sufficient Resources*', neither of the obstacle scales nor the *Productivity* criterion scale.

Table 11 Company 1: Relationships between outcome measures

Outcome	Individual (n = 27)				Group (n = 26)			
	Ideas		Implementation		Ideas		**Implementation**	
Measure	r	Sig.	r	Sig.	r	Sig.	r	**Sig.**
KEYS								
Creativity criterion	**.63****	**.001**	**.62****	**.001**	**.64****	**.001**	**.58****	**.002**
Organisational Encouragement	**.51****	**.007**	**.59****	**.001**	**.53****	**.004**	**.56****	**.003**
Challenging Work	.35	.077	**.43***	**.026**	**.47***	**.014**	**.49***	**.010**
Freedom	.26	.194	.328	.095	**.41***	**.033**	**.36**	**.074**
Work Group Support	.22	.279	.34	.083	**.35**	**.070**	**.41***	**.036**
NEO Five Factor Inventory								
Conscientiousness	**-.38**	**.052**	**-.55****	**.003**	-.35	.077	-.32	**.111**
Emotional stability	.32	.104	**.44***	**.021**	**.46***	**.015**	**.45***	**.022**
Openness to experience	.253	.203	.38	.050	**.39***	**.047**	**.48***	**.014**
Agreeableness	.16	.414	.19	.335	**.39***	**.043**	**.50****	**.009**

**Correlation is significant at the 0.01 level (2-tailed);
* Correlation is significant at the .05 level (2-tailed)

For the NEO-FFI of personality significant negative correlations were apparent between the *Conscientiousness* dimension and *individual idea generation and implementation*, and for the latter *Emotional stability* also appears significant. For both collective outcomes significant relationships were apparent with the *Openness to experience, Agreeableness* and *Emotional stability* dimensions. Whilst not differentiating between individual and collective outcomes, previous research highlights the significance of *Conscientiousness* and *Openness* as respectively inhibiting and facilitating creativity (Costa and McCrae 1992; Costa and McCrae 1995; Feist 1998; Peterson and Carson 2000; George and Zhou 2001; Carson, Peterson et al. 2003). Although this does not support the

suggestion that personality characteristics appropriate to the creativity and implementation stages might differ (Mumford & Gustafson, 1988) clearly the need exists for further research to substantiate these apparent differences between individual and collective idea generation and implementation.

The *Openness to experience* personality dimension is frequently cited in the literature as facilitating creativity (Carson et al, 2003; Costa & McCrae, 1995; Feist, 1998; George & Zhou, 2001; Peterson & Carson, 2000). Analysis of relationships in this study suggests *Openness* is significantly associated with collective idea generation and implementation but neither to idea generation nor implementation at the individual level. *Openness* assesses characteristics such as curious, broadminded, cultured and intelligent (Barrick & Mount, 1991) and, in this investigation, two questions that correlated very highly with all outcomes were based on intellectual curiosity and playing with theory or abstract ideas. From this it might be inferred that the *Openness to experience* dimension relates less to an intrapersonal orientation for intellectual curiosity, for example, but more to interpersonal *Openness* to the ideas of collective others.

Whilst this might be explained based on the association of the characteristics of the *Openness* dimension to positive attitude to learning experiences and, therefore, training proficiency (ibid), this fails to account for the lack of association to individual outcomes. The *Emotional stability* dimension is significantly correlated with all outcomes except *individual idea generation* and the *Agreeableness* dimension with *collective idea generation and implementation*. This supports previous findings where *Emotional stability* has been demonstrated as contributing to performance in most jobs and *Agreeableness* has been shown to contribute to performance in a team environment (ibid.). Strong negative relationships with *Conscientiousness* clearly support previous findings of this dimension as inhibiting creativity and innovation (Costa & McCrae, 1995; Feist, 1998; George & Zhou, 2001), although for individual outcomes.

Additional items were included in the SQ based on their relevance to creativity and innovation and the close associations with knowledge creation and management and learning, particularly those items included in the section on innovative culture and communication. Significant relationships between commitment to supporting the company in achieving its aims and objectives (SQ item 35) and perception of oneself as a creative and innovative individual (SQ item 30) are suggested for all four outcomes, and for the innovative culture and communication and innovation-oriented behaviour scales, the creativity-oriented behaviour scale reaching significance only for collective outcomes.

Table 12 Company 1: Intercorrelations of KEYS Scales

KEYS	**Criterion**	
	Creativity	**Productivity**
Organisational Encouragement	.575**	
Work Group Support	.557**	.373*
Challenging Work	.598**	
Supervisory Encouragement		.633**
Freedom	.439*	.466*
Sufficient Resources		
Workload Pressure		
Organisational Impediments		**-.475****

Correlations for all item scales with outcome measures are detailed in Table 12. Highly statistically significant bivariate correlations are evident for *Organisational Encouragement*, *Work Group Support* and *Challenging Work* – all Tier 1 stimulant scales – with *Creativity.* The obstacle scale, *Workload Pressure*, perceived as inhibitive by 48 percent of participants and by 38 percent as most important for improving creativity and innovation, a negative relationship with *Creativity* might be expected, which is not the case.

4.1.1.4 Discussion

Highly significant correlations between the KEYS *Organisational Encouragement* scale, the *Creativity* criterion and significant correlations with the KEYS *Challenging Work* scale and personality dimensions with all four outcome measures positively address RQ1.

Whilst the KEYS *Organisational Encouragement* and *Creativity* criterion scales were highly significant to all outcomes, C*hallenging Work*, *Freedom* and *Work Group Support* are associated with group outcomes. In respect of personality dimensions significant negative associations were apparent for the *Conscientiousness* dimension only for individual outcomes. For group outcomes, *Openness to experience*, *Agreeableness* and *Emotional stability* are suggested. Significance of the *Conscientiousness* dimension of personality with individual outcomes and the *Openness* dimension with group outcomes is upheld in the resulting regression models. Therefore, some differences are evident between individual and group outcomes. In respect of differences between idea generation and implementation processes, few differences exist. Individual implementation is associated negatively with *Conscientiousness* and positively with *Emotional stability*. *Work Group Support* is associated with group implementation. Also at the individual level, both the KEYS *Challenging Work* scale and the *Emotional stability* dimensions of personality appear to be significantly associated with implementation but not idea generation. As expected, highly significant relationships are evident between the four outcome measures and the *Creativity* criterion.

This investigation was conducted in the context of an SME where creativity and innovation are highly valued and given high priority within a teamwork environment where creative energies are harnessed through mechanisms that serve dual purposes of providing a forum to which current problems may be brought for discussion and as a training ground in creative problem solving techniques. Ideas are systematically managed and available for future use and the benefits of these mechanisms carefully monitored. The positive impact of changes introduced is evident from the very favourable responses to the majority of scales and items included in the various questionnaires. Respondents' identification of the single most important factor supporting creativity and innovation in their organisation clearly highlight those in the areas of *Management* (56%) and *Organisational attitudes, structures and procedures* (32%). Within these

areas, the main factors identified for management are clear vision (24%) and support from upper management (22%) and for organisational, attitudes, structures and procedures, mechanisms for developing ideas (14%) trust (7%) and *Openness* to new ideas (7%). Whilst the majority of items and scales are extremely positive, within such a seemingly supportive culture and climate, analysis of less supportive factors and elements are informative about how organisational creativity and innovation might be further enhanced. Respondents' identification of the single most important inhibiting factor and suggestions for improving creativity fall mainly into the categories of *Workload Pressure*s and organisational attitudes, structures and procedures, rather than the management category. *Workload pressure* represents one of only two scales that compare somewhat less favourably than most to the KEYS database, attracted 48 percent of responses for inhibitory factors and 38 percent of suggestions for improvement, yet there was no evidence of a negative relationship either with the *Creativity* criterion or with individual and group idea generation and implementation.

Although the *Creativity* criterion scale is highly significant in association with all outcomes in this investigation, it is also the second scale that compares less favourably relative to the KEYS database. Two possible explanations are explored. Firstly, creative requirement might not be universal throughout all departments, levels and functions of the organisation, although this is unlikely in an organisation where creativity and teamwork are so highly valued, supported and encouraged. The alternative, and more likely, interpretation is a lack of realisation by some of the workforce that creativity can be generated in any job and at any level of the organisation not just in jobs that are traditionally viewed as necessitating creativity (Madjar et al, 2002), and how to be creative in practice. Whilst supportive mechanisms and staff training in creative problem solving techniques are undoubtedly very useful to the facilitation of organisational creativity and innovation, this suggests a need for further training for some staff in identifying problem areas to which these might be

applied so that the utility of such techniques might be further enhanced. This interpretation also becomes very relevant to the notion of what it actually means in practice to be creative and innovative, highlighting a lack of shared meaning that Storey (2000) suggests is so common to many organisations. One of the interviewees suggested that to be creative in this context means the freedom to try out new ideas in a safe environment without the fear of humiliation or intimidation. Responses to many questionnaire items suggest that this is not commonly shared by all. For example, responses were less positive to items regarding encouragement of risk taking, acceptability of failure and concern about negative criticism. Further differences between two managers arising from analysis of personal constructs of the type of creativity that is valued would seem to suggest some ambiguity. Together this suggests that whilst shared meaning might exist rhetorically at the broad cultural level, how this disseminates throughout the organisation is open to subjective individual interpretation and uncertainty.

Through this in-depth investigation of a specific and complex organisational context using multiple sources of data, important issues in the facilitation of organisational creativity, are highlighted. Exploration of the contribution of key factors of supportive creative climate and individual characteristics supports previous findings whilst also providing unique insight for other factors. Unique insight is extended further through differentiation between individual and group idea generation and implementation and investigation of shared meaning.

4.2 **Stage 2**

4.2.1 Company 2: Background

Company 2 is involved with business improvement, comprising communication and motivation, events management, performance and incentive programmes. Formerly an independent small business the company had been acquired six years' previously by a US group

employing more than 1000 associates worldwide. At the time of data collection in 2006, the UK office employed approximately 120 associates, the majority of who are knowledge workers, servicing clients in Europe and operating autonomously from US ownership. The very basis of the business is providing creative solutions for clients and recently a major strand of the company's strategy has been to be more creative.

4.2.1.1 *Case study sample*

Of 120 sets of questionnaires distributed to all associates, 63 were completed, a response rate of 55 percent. By department, this ranged from 17 percent for Network Services to 100 percent for Food Service Rewards and Human Resource departments. The gender ratio was 40:60, male to females. Managers or supervisors provided individual creativity ratings for their teams. Considerable similarities were evident with respondents' self-ratings although there was a tendency for supervisors to rate more highly. Respondents' estimates of creative ideas generated and implemented on an individual and group basis ranged from 0 to 2000, although highest frequencies were reported in the categories from 1 to 50. Approximately 63 percent of respondents reported having never participated in training for creative problem solving. *Low priority* and *cost* represented the most frequently reported reasons for non-implementation. In respect of what it means to be creative and innovative in practice, high frequencies were evident for most categories. The five most frequently reported were *doing things differently, fresh perspectives, exceeding expectations, fun* and *challenging preconceived ideas.*

4.2.1.2 Summary of Interviews and Repertory Grids

Formal semi-structured interviews took place with the Human Resources Director and the Client Services Director, although there were informal discussions with other associates, including section heads. Management interviews suggested that creativity and innovation are highly desirable, highly valued, given high priority and expected from the majority of the workforce.

The majority of the sample shares perceptions that creativity and innovation mean *fun*, *fresh perspectives* and *exceeding client expectations*. However, this is different to understanding the requirement of creativity for all departments and individuals, and how to achieve this in practice. The misconception might be that creativity refers only to the aesthetics of the Creative (design) department rather than a skill applicable to improving most areas of project work across all departments. Also emerging from the interviews were indications of a fragmented approach, evident from multiple references to lack of collaboration and co-operation between specialist departments rather than the necessary integrated and holistic approach to addressing client needs. Some associates perceive structures and procedures as excessively rigid.

Interview 1

The interview with the HR director strongly supported the need for creativity in client solutions. The leadership team, the equivalent of the Board, heads organisational structure. The two main departments are Events and Client Services. Others include the Creative Studio, Technology Team and Food Service Rewards. At the time of the interviews the HR Director and the MD had both been in post for two years, prior to which it was managed by the founders very much in a command and control style. Through what was largely a bottom up process, jointly their efforts have transformed the culture of the company to one where associates are empowered and *'expect that they are free to do or say anything and that they will not be shot down'*, providing it is for the benefit of the company.

While many staff were recruited into this culture, some 'old school' members find adaptation difficult. The company operates certain incentives including, for example, 'no emails' Fridays that allow associates to catch up on their work before the weekend, and 'dress down' Friday, the afternoons also being set aside for socialising. Rating questions elicited that creativity and innovation are highly *desirable*, highly *valued*, given

high *priority*, and that the majority of associates are *expected* to be creative

In response to what it means to be creative and innovative the need to *exceed client expectations* was suggested; *bringing fresh perspectives, ideas, looks and feels; challenging client conceptions* and involving clients in the development of fresh and exciting ideas for their companies. Internal examples of HR practices demonstrate the commitment to creativity. For example, in recognition of the national *Learning at Work* day (Company 2.1.108), the company has a *week* dedicated to activities such as swapping of roles by the leadership team and *Fantasy Boss* where associates make suggestions resulting in a memorable visit for one of them to meet their 'fantasy boss'!

Associates in the Creative Studio comprise graphic designers and a copywriter typical of creative industries and are responsible for the visual aspects of projects and campaigns. For example, Mini *mayhem in Marrakech* (Company 2.1.192) for which the CS designed and produced all the pictures logos and strap lines. Working with associates who owned the project,

> "they start to think about what it might be called, how does it look and feel, what's the branding, how will people know about it and how can it be kept alive for the duration of the programme?"

Some creative mechanisms are in place for other associates; for example, the Client Services Director and the Managing Director had both begun training in 'different brainstorming techniques' and, at the time of the interviews, were in the process of building a creative room with toys, gadgets, gismos and whiteboards. Training is very much ad hoc as dictated by projects, rather than regularly reinforcing creative thinking (Company 2.1.213). Creative behaviour is recognised and rewarded. The HR Director also indicated *strong agreement* that some people have the

potential to be more creative than others do and that the potential to be creative exists *across all* levels, functions and roles in all areas of the organisation, with the exception of Finance.

Exploration of personal constructs using the repertory grid technique highlighted useful and informative examples of creative ideas, some implemented, others not. Examples included two teams of associates asked to suggest new ideas for employee benefits schemes. An excellent suggestion for a scheme personalised to employees' lifestyles via the web with the aim of enhancing work life balance was unfortunately, unacceptably resource heavy and presented an unacceptable risk (Appendix 2.1.321). That implemented was of a much smaller scale, involving a reward system aimed at companies with large numbers of people doing standard jobs, often of a transient population (e.g. retail) where turnover is high. Rather than reward positive behaviour with say a £10 bonus that is of little value after deductions, the manager gives staff a scratch card, which could be a meal for two, cinema tickets or electrical goods, for example (Company 2.1.329). Because it is immediate, the reward is likely to be more highly valued. Others examples included the introduction of personal development vouchers for staff to spend as they wish, not necessarily directly relevant to work (e.g. piano or guitar lessons or a nutritional course). Another example is the Creative room resulting from the need for internal redecoration based on the remit to reinforce the company brand. This resulted in a floor to ceiling Perspex display made up of rectangular slots into which obscure pictures or a collage, maybe related to a client or the company, are inserted and associates have to work out what it is (Company 2.1.388). Personal construct components cluster around the constructs of *unacceptably high risk, radical, client inspiration* and *kudos* where the only element not to have been implemented lies, that of the lifestyle employee benefits scheme. The opposite end of this component, defined in terms of *low risk, incremental, employee inspiration* and *minimal impact.* Elements elicited for creative people constructs reveal the emergence of two components: the first

comprises *open-minded, external networks, receptive to new ideas, integra*l and *seeks external stimuli; the opposite end of the construct represented by closed, maintains status quo, little networking, unreceptive to new ideas and isolated* and where the directors of Finance and Network Services are located. The second component comprises *external client focus* and *highly imaginative* at one end (Client Services Director and Managing Director, *practically imaginative* and *internal focus* at the other. However, some caution is necessary as the constructs do not sit squarely on these components. For example, four of the directors would fall into the two quadrants determined by *external focus, highly imaginative, open-minded, receptive, seeks external stimuli, external networks.*

From this point forward in this investigation, the use of the repertory grid technique was discontinued due to the limited value added relative to the other methods.

Interview 2

The interview with the Client Services Director suggested slightly lower ratings for the *desirability*, *expectation* and *value* of creativity and innovation. However, *priority* is mid-point on the scale and raises interesting insights. It is not that the business does not rate creativity highly or give it high priority, rather that,

> "we operate at 150 mph all the time' and associates tend not to prioritise creativity. Rather than allowing time for the creative process, they're just expecting it to happen" (Company 2.2.18).

While the organisation gives a higher priority to creativity and innovation, for associates the pace of work is not supportive. Asked to explain in his own words what creativity and innovation mean within the context of this company, the interviewee very much describes creativity as an approach and a process:

> "It's about creating the right environment. Getting a broad mix of people involved, canvassing everyone's' views, and getting them to think freely. Getting rid of the hierarchy in the room and actually expressing themselves. To come up with lots of ideas ... they're not looking for 'the' idea but should come up with lots of ideas, and then filter those ideas down into what's right for our clients."(Company 2.2.128)

Asked about supportive mechanisms brainstorming sessions for the mid-term planning process were suggested, rather than any regular or focused commitment to skill development or embedding such processes. However, at the time of this interview the intention was to set up further mechanisms such as regular group meetings where people are able to bring actual problems to generate creative ideas in order to embed the need to creativity and innovation into the organisation. Presented with the final question the Client Services director was of the view that given the right environment everyone has the potential to be creative and strongly believed that the potential to be creative exists in all departments and job functions and across all levels.

Asked if he wished to contribute anything else of interest the interviewee stated he has now taken ownership of the key strand to be more creative of the revised strategy and would be working with a member of the Creative Studio to look at the issue of how to enhance creativity. The associate referred to had contributed through informal discussion already. Arising from this meeting was the sense of frustration among the design team in not being able to use their creativity as often and as freely as they would like. In particular, their involvement is often in the later stages of the process, which allows them little or no input into the planning but also means their input has to be rushed.

A third interview took place at the request of the Data Analytics Manager, who expressed an interest in this investigation. This related to his

previous position was with HHCL, an advertising agency that had been voted the 'Most Creative Agency of the Decade' around 2001 and who he refers to as 'professional radicals'. See Appendix B for details.

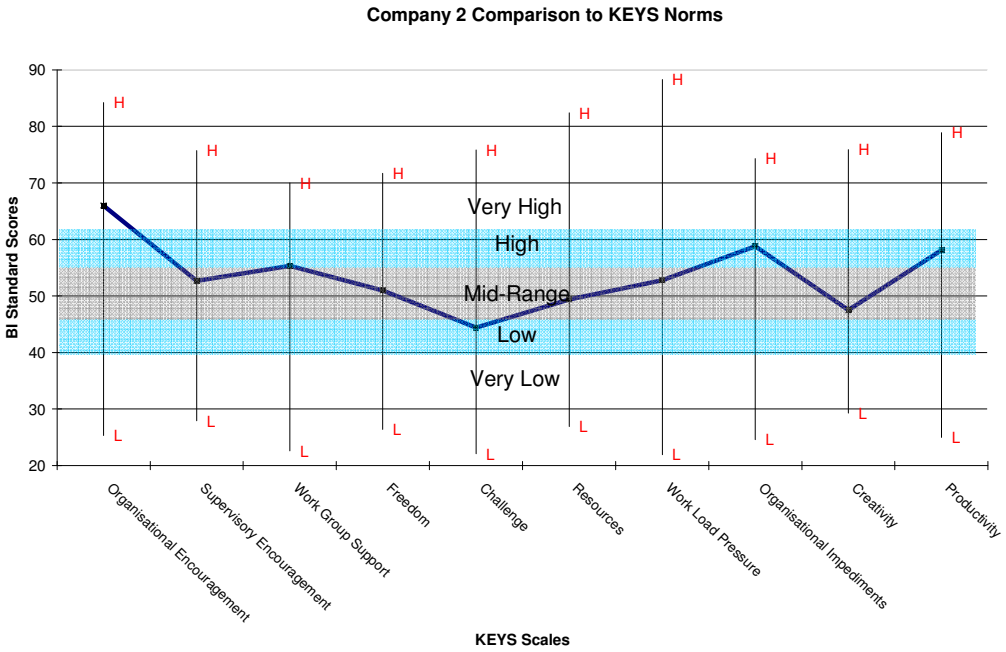
4.2.1.3 Questionnaires

KEYS: Assessing the climate for creativity

Overall responses were generally positive and conversion to standard scores (Figure 4-5) clearly indicates that most of the stimulant scales fall around mid-range, *Organisational Encouragement*, falling into the very high region. Items perceived less positively included acceptability of failure if the effort was good and risk taking. Possible explanations of this are the very nature of the business and the consequences of failure or excessive risk taking in securing projects. Alternatively, it might reflect a very real misconception or a lack of shared understanding. Using standard scores, only the expectation by top management that people will do creative work compares less positively. The most obvious interpretation would be that not all share the need of creative requirement or that the necessary mechanisms are not yet in place to stimulate and sustain creativity?

Work Group Support was perceived very positively by respondents but the range of scores on this scale is narrow and conversion to standard scores positions this company at the top of the mid-range relative to KEYS norms. Items comparing less favourably included challenging of others' ideas and helping others in the group. *Challenging Work*, a stimulant scale based on perceptions of having to work hard on challenging tasks and important projects, was low. *Challenging Work* can be extremely motivating and can lead to a sense of achievement and satisfaction as can the recognition that individual contributions are valued. Perceptions of significant proportions of associates suggest they do not perceive their work is challenging or that their contribution is urgent or important. Item analysis of the *Supervisory Encouragement* scale highlights enormous variation between items.

Figure 4-5 Company 2: Comparison to KEYS norms



Item analysis of the obstacle scale, (lack of) *Organisational Impediments*, reveals variation. Items perceived less positively include procedures and structures that are too formal, pressure to produce anything acceptable even if quality is lacking, destructive criticism and hindrance by other areas. On the *Productivity* criterion Company 2 falls in the high range, although the *Creativity criterion is* mid-range. Of course, one-third of all organisations fall into the mid-range, increasing to two-thirds extended to the low and high ranges (i.e. scores 40><60). As an organisation where creativity is central to the core business and currently a strand of the strategy in delivering client solutions, there is clearly a need for greater support for creativity and innovation, in addition to development of shared meaning and understanding.

Departmental analysis of organisational climate for creativity

Analysis of KEYS scales by department suggests significant variability with three departments broadly positioned higher than for the company overall, others lower, as shown in Figures 4-6 and 4-7. Those higher include the Managing Director, HR, Administration and Food Services Rewards. Those lower are customer-focussed operations incorporating the Client Service Team, Sales and Corporate Marketing, Live Events, Solutions

Delivery Team and Creative. *Organisational Encouragement* appears high for all departments as does (lack of) *Organisational Impediments* with the notable exception of two departments, Creative, and Sales and Corporate Marketing. *Supervisory Encouragement* and *Work Group Support* appear lacking in the Creative Studio and Solutions Delivery Team. *Challenging Work* appears lacking for most.

Figure 4-6 Company 2: Departmental Comparisons to KEYS Norms

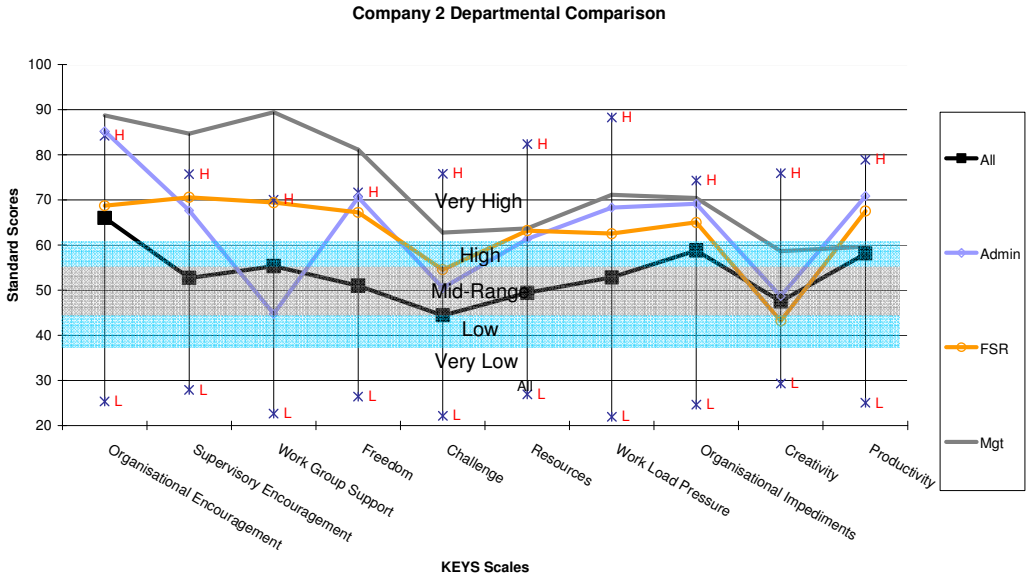
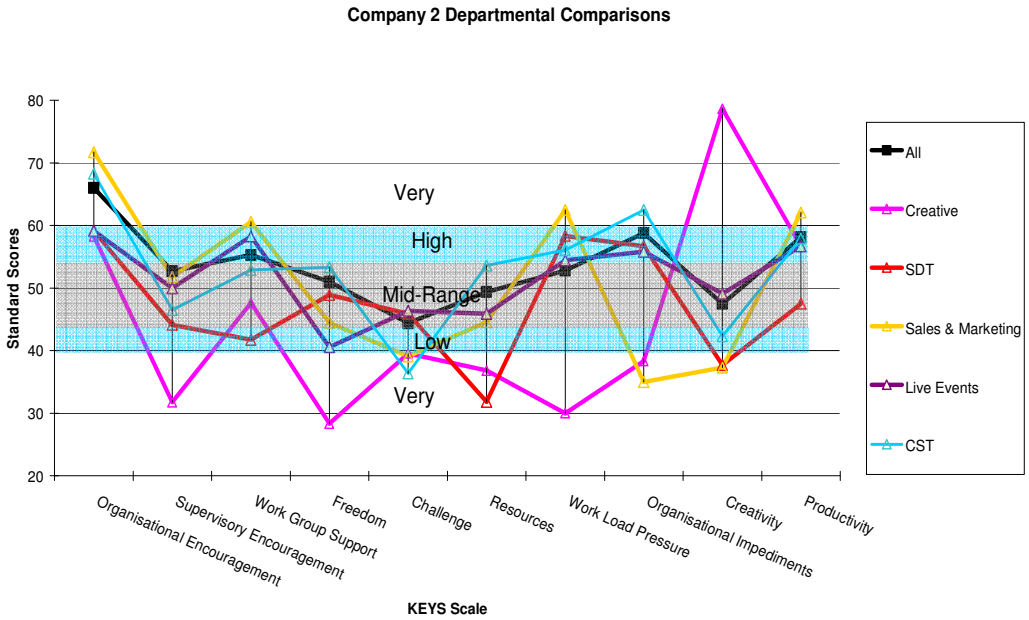


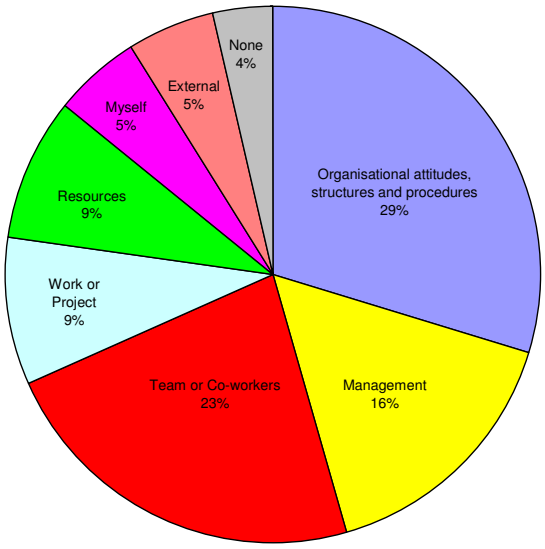
Figure 4-7 Company 2: Departmental Comparisons to Keys Norms



Interestingly, *Workload Pressure* only appears problematic in the Creative Studio, which is unique in being exceptionally high on *Creativity*, but low on all others, except for *Organisational Encouragement*. This might be interpreted as an example of the importance of creative requirement, i.e. the expectation that creative work is necessary and knowing how to deliver on this requirement. Alternatively it might indicate that 'creative types' succeed regardless of supportive climate?

KEYS Section II: Checklist items

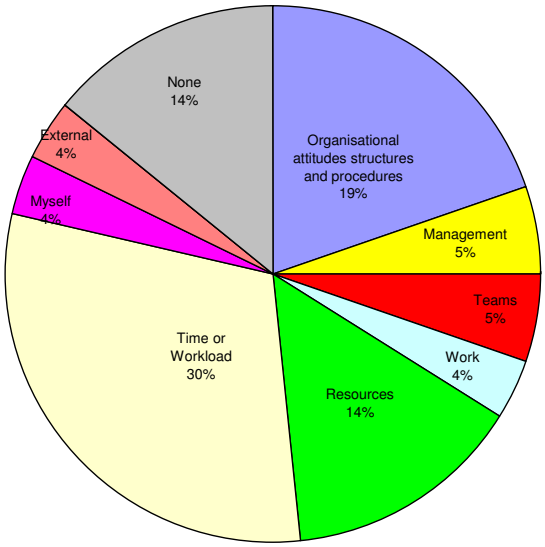
Figure 4-8 Company 2: Most important factor supporting creativity and innovation?



Organisational attitudes, structures and procedures	**%**	**Team or Co-workers**	**%**
Encouragement/support from other groups	3	Personal characteristics	4
Communication and collaboration around ideas	7	Good blend of skills	9
Openness to new ideas	14	Support	5
Recognition of creative work	2	Constructive debate	5
Trust across the organisation	3	**Work or Project**	%
Management	**%**	Interesting work	5
Encouragement/support from immediate supervisor	3	Autonomy or *Freedom* in choosing/ carrying out projects	4
Encouragement/support from upper management	3	**Resources**	%
Clear vision for the organisation by upper management	9	People	7
Myself	%	Training and Development	2
Personality characteristics	2	**External Factors**	%
Abilities	3	Competitive industry	3
None	4	Customer requirements	2

On the *Creativity* criterion, Client Services fall in the low range while Solutions Delivery, and Sales and Corporate Marketing fall into the very-low range. From this analysis it becomes clear that the C*reativity* criterion scale for the company overall would be even lower if it were not for the Creative department and the small team comprising the MD and two members of HR.

Figure 4-9 Company 2: Most important factor inhibiting creativity and innovation?

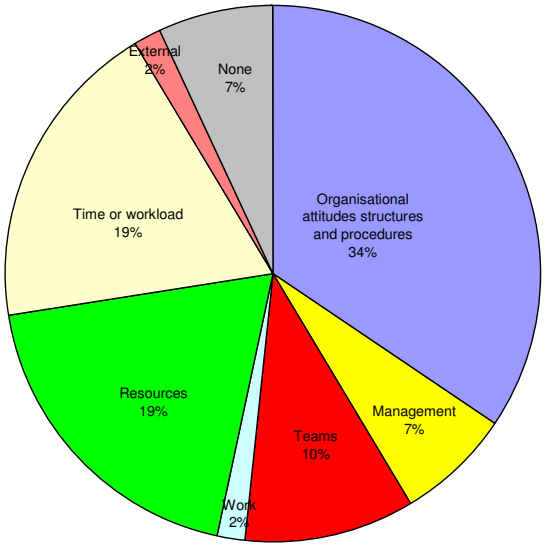


Organisational attitudes, structures and procedures	**%**	**Team or Co-workers**	**%**
Apathy	3	Lack of support	3
Avoidance of risk	3	Unconstructive debate	2
Evaluation systems	2	**Time or Workload**	**%**
Rigid processes and procedures	2	Insufficient time	23
Lack of advance development groups	2	Too much work	7
lack of mechanisms for developing/implementing new ideas	2	**Work or Project**	%
Lack of communication and collaboration around ideas	2	No room for creativity	2
Lack of *openness* to new ideas	2	Lack of clear goals	2
Outsourcing of development	2	**Myself**	**%**
Management	**%**	Personality characteristics	4
Poor project leader	2		
Other behaviours of immediate supervisor	2	**Resources**	%
Lack of encouragement from upper management	2	Money	5
External Factors	%	People	4
Customer Requirements	4	Information	3
None	14	Training and Development	2

Figure 4-8, based on useable data from 57 associates, illustrates three categories that account for more than two-thirds of responses on the main

factor supporting creativity. For *Organisational attitudes structures and procedures*, this is attributable to *Openness to new ideas* and *communication and collaboration around ideas.* In the category *team or co-workers*, this relates to *support*, *constructive debate* and *skills blend.* In the *management* category, *clear vision* and *encouragement by upper management* were reported most frequently.

Figure 4-10 Company 2: Most important suggestion for improving the climate?



Organisational attitudes, structures and procedures	**%**	**Team or Co-workers**	**%**
Advance development groups	2	More support	3
Better evaluative systems	3	More constructive debate	2
More encouragement/support from other groups	5	Let us work in teams	2
Improve processes and procedures	2	Give teams control over the work	3
Better mechanisms	10		
Better communication and collaboration	9	**Work or Project**	%
More *openness* to new ideas	2	Clear goals	2
More recognition for creative work	2	**None**	7
Management	**%**	**Resources**	%
Better project leaders	3.5	Money	7
More encouragement from upper management	3.5	People	3
External Factors	%	Training	7
Better customer contact or knowledge	2	Conducive physical environment	2
Time or workload	%		
More time	19		

Factors perceived as inhibiting are illustrated in Figure 4-9, again based on useable data from 57 associates. The most frequently identified category by far attracting 29 percent of responses was time or workload. *Insufficient time* for work accounted for 76 percent of responses in this area and for 23 percent of total responses. Suggestions for improving the climate for creativity and innovation are illustrated in Figure 4-10, based on useable data from 58 associates. This clearly indicates more than one-third in the category *organisational attitudes, structures and procedures*. Better *mechanisms for new ideas*, better *communication and collaboration* and more *encouragement* and *support* from other groups combine to account for 70 percent of responses in this category. *Time or workload* also features quite strongly, as might be expected from the prominence of these responses as inhibitory.

Relationships between factors

Significant relationships should exist between KEYS scales, particularly between those in Tier 1 (*Organisational Encouragement*, *Work Group Support* and *Challenging Work*) with the outcome measures in a creative environment. In Company 2 *Organisational Encouragement* falls into the very high range compared to KEYS database norms and Lack of *Organisational Impediments*, a Tier 2 scale, also falls into the high range. However, the analysis also suggests that most of the other scales, including the *Creativity* criterion scale, are mid-range. Similarities and substantial differences exist between the various departments and huge differences exist between items in some scales, *Supervisory Encouragement* and *Organisational Impediments*, for example. Where the organisational climate for creativity is less supportive significant associations between KEYS scales and outcome measures are unlikely. Table. 13. details statistically significant relationships between outcome measures, climate factors and personality dimensions.

In Company 2 the relationship between self and supervisor ratings of creativity are highly significant (r .341, $p<.01$) and highly significant relationships exist between both self (r.784, $p<.001$) and supervisor ratings

(r .340, p<.01) with self-perceptions of creativity as measured by the question 'To what extent do you perceive yourself as a creative and innovative individual?' Self-rating and self-perception both correlate very highly (p<.001) with all individual and group outcomes. Supervisor ratings correlate significantly (p<.05) only with individual outcomes. Highly significant relationships are also evident between all outcome measures, with the exception of supervisor ratings, with the KEYS *Creativity* criterion.

Table 13 Company 2: Relationships between outcome measures

Outcome / Measure	Individual (n = 27)		Group (n = 26)	
	Ideas	Implementation	Ideas	**Implementation**
	r	r	r	**r**
KEYS				
***Creativity* criterion**	.421**	.416**	.462**	**.450****
Challenging Work	.312*	.340*	.285*	**.269**
Sufficient Resources	-.316*	-.394**	-.282*	**-.349***
(Lack of) Organisational Impediments	.386**	.372**	.370**	**.316***
(Lack of) *Workload Pressure*	.471**	.469**	.445**	**.436****
NEO Five F actor Inventory				
Openness to experience	.359**	.391**	.389**	**.401****
Agreeableness			-.288*	**-.305***
***Significant at the level of p<.05**		**** Significant at the level of p<.01**		

In respect of the KEYS creative climate survey, no relationships achieved required levels of statistical significance for two of the Tier 1 scales, *Organisational Encouragement* and *Work Group Support*, with any of the outcome measures. However, significant relationships are demonstrated for *Challenging Work* with both individual outcomes and group idea generation at the level of p<.05. Analysis of the *Organisational Encouragement* scale clearly highlights some areas of critical importance to a climate supportive of creativity and innovation for which standard scores based on associate responses are much lower than the other scale items. For example, encouragement of risk, acceptance of failure, expectation of creative work and the need for creative problem solving, which likely account for the lack of any statistically significant relationships for the *Organisational Encouragement* scale with any of the outcome measures.

Supervisory Encouragement and *Freedom*, Tier 2 scales, both fall into the mid-range compared to database norms and no significant relationships

are evident for either of these scales. However, the above analysis reveals huge variation between scale items for *Supervisory Encouragement*. Relationships between (Lack of) *Organisational impediments*, the third of the Tier 2 scales, are significant for all individual and group outcome measures. Significant relationships exist between the Tier 3 scale, (Lack of) *Workload Pressure,* with all outcomes. Significant relationships are also evident for *Sufficient Resources*, although negative, the most likely explanation for which might be that creativity might actually increase awareness of potential organisational obstacles?

The most significant relationships are those between individual and group idea generation and implementation and the *Openness to experience* dimension of personality. All relationships are highly significant at the level of $p<.01$ and further supported through a significant relationship with supervisor ratings (r .274, $p<.05$). It is suggested that this relationship, which is supported by some leading figures is the most important in contributing to creativity in this organisation where the organisational climate appears to be somewhat hindered in supporting creativity. Further support for the contribution of personality dimensions is evident from the significant associations of *Openness to experience*, *Extraversion* and *Emotional stability* dimensions with the *Creativity* criterion. Only *Extraversion* and *Agreeableness* are associated with *Productivity*. In this organisation, the personality dimension of *Openness to experience* appears to contribute significantly to creativity.

Departmental comparison to KEYS database norms, as illustrated in Figures 4-5, 4-6 and 4-7, show interesting contrasts between perceptions of organisational groups. In particular, perceptions of the MD and HR are very high for most scales, but with the exception of Administration and Food Services Rewards, other departments fall significantly lower on most scales. This is likely to be an indication that shared meaning and understanding of how to be creative and innovative does not cascade throughout the company. Training in creative problem solving, individual,

and group outcome measures seem associated with seniority. Whilst some training in brainstorming in particular had taken place, up to the time of data collection, this seems to have been a rather piecemeal and practical approach rather than a commitment to developing the creative potential of associates. Some associates identified a lack of mechanisms for idea generation. It would be useful to put in place regular sessions to which associates can bring very real and practical problems on current projects. These would serve the dual purpose of developing creativity skills, using various techniques, so creativity skills become a part of associates' overall repertoire of skills. In this way, training is practical and developmental at the same time.

Table 14 Company 2: Intercorrelations of KEYS Scales

KEYS	Criterion	
	Creativity	Productivity
Organisational Encouragement		.533**
Work Group Support	.297*	.525**
Challenging Work	.487**	.311*
Supervisory Encouragement		.276*
Sufficient Resources		.319*
Organisational Impediments		-.250*

Greater creativity in this company is associated with the *Openness to experience* dimension of personality where the climate is lacks support, particularly in the operational departments. This suggests that by enhancing the climate to provide greater support for creativity is likely to enhance the potential of associates to apply their skills. This presents an extremely interesting picture, which suggests that only two stimulant scales are supportive of Creativity, both Tier 1. However, five stimulant and one obstacle scale appear associated with organisational *Productivity*. The relationship of *Challenging Work* with *Creativity* is highly significant. However, respondents' perceptions position the company in the low range relative to KEYS norms. Therefore, making the work more challenging is likely to enhance organisational creativity. Evidence of highly significant relationships for *Organisational Encouragement* and *Work Group Support* suggest both are supportive of *Productivity* than *Creativity*. Scale item analysis further substantiates variability between items. Those falling into

the low range included acceptability of failure, encouragement of risk taking, the expectation of creative work and the need for creative problem solving – precisely those associated with *Creativity* rather than *Productivity*.

To summarise, creativity is central to the core business of Company 2 that is allied to advertising and marketing, typically traditionally creative. Yet, regardless of the introduction of creativity as a strand of the current strategy and many openly 'creative' initiatives, creativity remains only mid-range comparative to KEYS norms. Most scales fall into mid-range and there is huge variability between departments, emphasising the apparent lack of integration suggested. Senior management and administration are generally higher than the majority of departments relative to KEYS norms and, on the *Creativity* criterion, lack of shared meaning is particularly apparent, all departments other than the Creative Studio falling into mid-range, at best. Company 2 appears *Productive* rather than *Creative*, only *Challenging Work* (low) and *Work Group Support* significantly associated with *Creativity.* In this environment, *Openness to experience* is significantly associated with *outcomes*. While 68 percent of responses for the single most important factor supporting *Creativity* fall into the categories *Organisational attitudes, structures and procedures*, *Management* and *Teams*, variation demands further analysis and intervention at a departmental level. The MD and HRD had been in post for only two years at the time of data collection and the company was in the process of transition and transformation.

4.2.2 Company 3: Background

Company 3 offers a full range of B2B handling and fulfilment services designed to enhance clients' marketing and promotional supply chain, including storage and stock management, receipt and processing of orders, collation and distribution, data management and direct mail, order fulfilment , contact centre services, competitions and loyalty programmes. Initiation of contact by mail, followed-up by telephone resulted in an

interesting conversation that provoked interest and enthusiasm to participate. The Group Managing Director suggested that the company is not creative in the slightest but that perhaps it needs to be more so. In this way, Company 3 represents a direct contrast to Companies 1 and 2 that actively aspire towards creativity and innovation.

4.2.2.1 Case study sample

At the time of data collection in 2006 the company employed approximately 90 staff. Of these, 40 were skilled knowledge workers that formed the focus of this study. At the time of the interview with the Group Managing Director, sets of questionnaires were distributed and collection arranged to coincide with the interview with the Personnel Manager. Thirty sets of questionnaires were completed, by management and supervisory staff, representing a 75 percent response rate. Of these 12 were from Client Services, 13 from the Business Unit and 5 from other areas including HR, Finance and IT. The sample comprised 14 males and 16 females.

4.2.2.2 Summary of Interviews

Interview 1

An initial meeting jointly with the Group MD and the Personnel Manager prompted the former to talk about the interest and enthusiasm provoked by our initial telephone discussion. Reflecting on her suggestion that the company is not creative, she explained that first perceptions might have been relative to the world of advertising and marketing with which the company associates? It was suggested that [creative] problem solving is certainly encouraged in the company. Management is structured around three levels, the Board, two Business Unit Directors and Business Unit Managers responsible for operations.

Asked to what extent creativity and innovation are desirable in this organisation on a scale of 1 (low) to 7 (high) the interviewee suggests,

> "Now that I've changed the way I'm understanding creativity, which you did to me on the 'phone, I would say 5, but prior to that I would probably have said 3. ... because I didn't look at coming up with new ideas and new ways of doing things as necessarily creative." (Company 3.1.74)

A similar rating claimed an *expectation* of creativity from the workforce and a suggestion that creativity and innovation can evoke ambiguity. Asked to explain in her own words what creativity and innovation mean again evoked an interesting response:

> "It's terribly hackneyed, but it means is working smarter, not harder. We have things we have to do. It means finding ways to do them quicker, better, more enjoyably and, therefore, releasing time, effort and energy to find other things to do. One of our mentors uses an expression that has transferred to company folklore, which is ... thinking right around the cup ... so trying to remember that what I'm looking at there might look completely different from a different perspective and I might find a handle that allows me to pick it up more easily. So that what it means to me. More cross-departmental problem-solving."(Company 3.1.133)

The Group MD agreed very strongly with the suggestions that some individuals have a greater potential than others to be creative and innovative and that the potential for creativity and innovation exists across all levels, functions, roles and departments.

Interview 2

The Personnel Manager rates the *desirability* and *expectation* for creativity and innovation as quite high, although *priority* as mid-point of the 7-point scale. All ratings are somewhat higher than those of the MD. Asked to explain what creativity and innovation mean in practice it was suggested that it means,

> "wider client capability ... more services to more clients (Company 3.2.127) ...it's about cost rather than innovation, that they come to us because they know what they need doing but don't think about it in the same way we do so it's probably less efficient than the way we do it (141). In my mind creativity is taken from ... this is what is available (215)."

Strong agreement was indicated to the suggestion that some individuals have greater potential to be creative, although the rating for the potential across all roles, functions, levels and departments was much lower at 3-4 on the 7-point scale.

4.2.2.3 *Questionnaires*

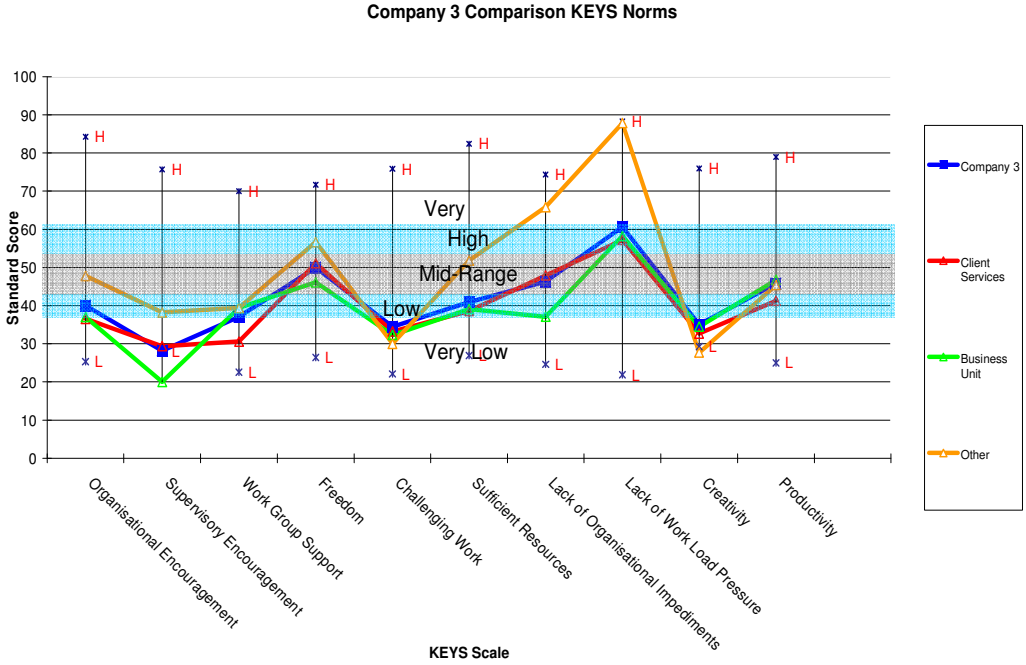
Prior to distribution of the questionnaires to staff, managers were asked to provide individual ratings for their teams. Considerable similarity was evident with participants' self-ratings, 'moderate' representing the majority for both. Wide variations existed in respondents' estimates for individual and group idea generation and implementation, ranging from zero to 400. Approximately 50-60 percent fell into the ranges 1-50 across all outcomes. Approximately 63 percent of respondents reported having never participated in training for creativity or creative problem solving, whilst 37 reported percent reported some training. Low priority and cost represented the most frequently cited reasons for non-implementation. In response to the question of what it means in practice to be creative and innovative highest frequencies were evident for *exceeding expectations, doing things differently* and *fresh perspectives.*

KEYS: Assessing the climate for creativity Overall responses were mixed. Conversion to standard scores allows comparison of Company 3 with other companies in the KEYS database. Figure 4-11 clearly indicates that the only scale falling into the high range is (Lack of) *Workload Pressure*,

an obstacle scale. All other scales are mid-range, low or very low and, as expected, both the *Creativity* and *Productivity* criterion are low.

Analysis based on the strength of differentiating factors between high and low creativity environments it is apparent that of the Tier 1 scales, *Organisational Encouragement* is low while *Work Group Support* and *Challenging Work* are very low. For *Organisational Encouragement* most items were responded to negatively although with exceptions including the perception of an open atmosphere and the acceptability of failure providing there was a good effort. *Work Group Support* suggests greater variability. Responses were more positive on perceptions that co-workers make a good team; there is a feeling of trust; a good blend of skills and open communication. Negative responses were evident for *openness* to new ideas, helping each other and commitment to the work. *Challenging Work* represents a critical factor in stimulating creativity through a sense of having to work hard on challenging tasks and important projects. All items in this scale were low or very low.

Figure 4-11 Company 3 Comparison to KEYS norms



Of the Tier 2 scales, *Supervisory Encouragement* is lowest and, as would be expected, most items are perceived very negatively by respondents, although there is a lot of variability in item responses. *Freedom*, by comparison, is the only stimulant scale in the mid-range. The second obstacle scale, (Lack of) *Organisational Impediments*, falls in to the mid-range. Again, there is quite a lot of variability between items. Those perceived less favourably include strict control by upper management, protection of territory, people being too critical of new ideas and destructive criticism. (Lack of) *Workload Pressure*, Tier 3, is the only scale in the high range and analysis reveals little variability between items. *Sufficient Resources*, the second Tier 3 scale, is low and very little variation is evident between items. Of the criterion scales, *Creativity* is very low and *Productivity* low with very little variation between items.

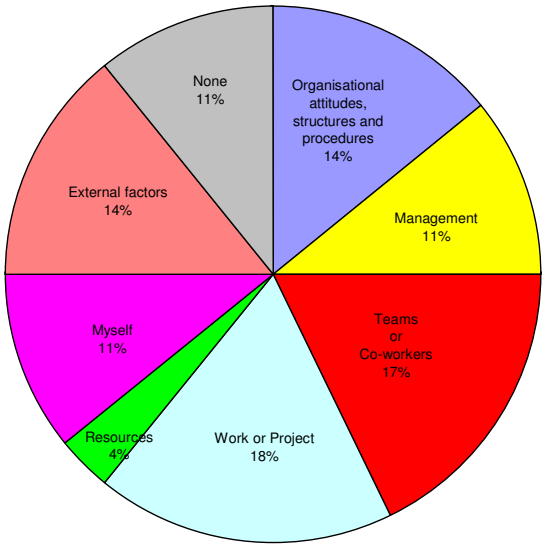
Departmental comparison (Figure 4-11) indicates similar patterns across the organisation, although 'other' (management, HR, Finance, Administration) experience exceptionally little *Workload Pressure or Organisational Impediments*. It is reasonable to interpret this as an organisation where creative problem solving is encouraged but not actively stimulated or supported through shared meaning that is translated into appropriate policies and practices that are transparent to all parties.

KEYS Section II

Each of the checklist questions in Section II uses data from 28 respondents. As illustrated in Figure 4-12 it is interesting to note the spread of responses between categories rather than clustering into a few supportive categories. This further reflects the respondents' perceived lack of support.

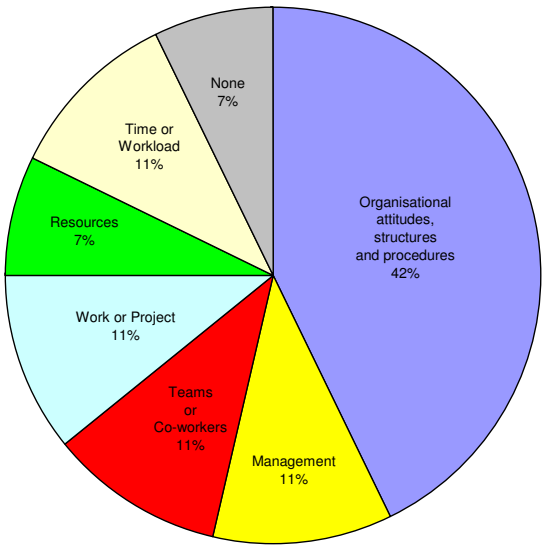
Organisational attitudes, structures and procedures clearly emerges as the category perceived as most inhibitive of creativity and innovation, as shown in Figure 4-13. More specifically, lack of recognition for creative work, lack of encouragement and support from other groups and apathy.

Figure 4-12 Company 3: Most important factor supporting creativity and innovation?



Organisational attitudes, structures and procedures	%	Work or Project	%
Encouragement/support from other groups	4	*Challenging Work*	11
Communication and collaboration around ideas	11	Interesting work	4
Management	%	Autonomy/*Freedom*	4
Encouragement/support from supervisor	4	Myself	%
Other supervisor behaviours	4	Personality	4
Clear vision by upper management	4	Abilities	7
Teams or Co-workers	%	External Factors	%
Personal characteristics/abilities	4	Competitive industry	4
Openness to ideas	4	Customer requirements	11
Support	4		
Trust	7		

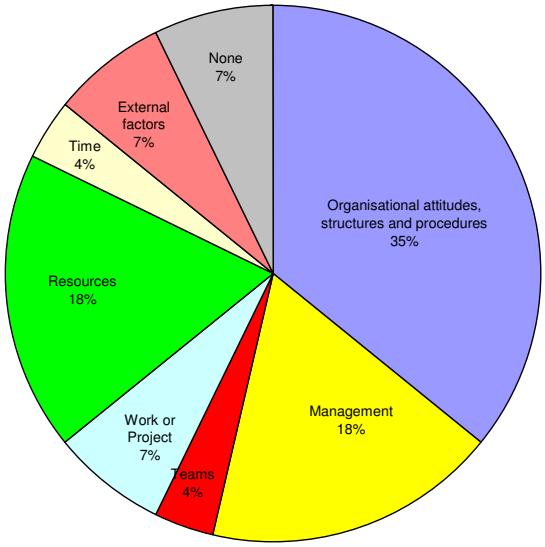
Figure 4-13 Company 3: Most important factor inhibiting creativity and innovation?



Organisational attitudes, structures and procedures	%	**Work or Project**	%
Apathy	7	Boring work	4
Avoidance of risk	4	No room for creativity	4
Rigid process and procedures	4	Lack of clear goals	4
Lack of encouragement/support from other groups	7	**Teams or Co-workers**	%
Lack of *openness* to new ideas	4	Poor communication/ *openness*	4
Lack of recognition for creative work	11	Lack of support	4
Lack of trust across organisation	4	Lack of trust	4
Desire to maintain status quo	4	**Resources**	%
Management	%	Insufficient information	7
Lack of encouragement/support from upper management	11	**Time**	%
		Insufficient time	11

Management highlights the lack of encouragement and support from upper management. A similar pattern emerges for suggestions to enhance creativity and innovation, where these two categories again attract 53percent of responses.

Figure 4-14 Company 3: Most important suggestion for **improving** the climate?



Organisational attitudes, structures and procedures	%	**Work or Project**	%
More encouragement/support from other groups	4	More *Challenging Work*	4
Improve processes and procedures	4	Clear goals	4
Better communication/collaboration around ideas	4	**Teams or Co-workers**	%
Clearer definitions of roles and responsibilities	4	Greater control	4
More recognition for creative work	7	**Resources**	%
Mentoring by senior creative people	4	More money	4
Break out of status quo	11	More information	4
Management	%	More training and development	11
Better project leaders	4	**Time**	%
More encouragement/support from supervisor	4	More work	4
More encouragement/support from upper management	4	**External factors**	**%**
Clearer vision by upper management	7	Clearer customer requirements	4
		Better customer contact or knowledge	4

Relationships between factors

Where environments are not supportive of creativity associations between KEYS scales and outcome measures are unlikely to be statistically significant. This was the case overall in Company 3 for most scales. Table 15 shows the only statistically significant relationships. Significant relationships are suggested with individual idea generation and implementation at the level of p <.05 although relationships for group outcomes are not statistically significant. However, for the Business Unit significant relationships for all four outcome measures at the level of p <.05 was suggested with *Work Group Support* scale, and highly significant relationships at the level of p <.01 for group ideas and implementation with the *Freedom* scale. Respondents' self-ratings for creativity correlate significantly at the level of p<.05 with all four individual and group outcome measures as do self-perceptions, as indicated by the question 'To what extent do you perceive yourself as a creative or innovative individual?'

Table 15 Company 3: Relationships between outcome measures

	Individual				Group			
	Ideas		Implementation		Ideas		**Implementation**	
	r	sig	r	sig	r	sig	r	**sig**
KEYS Creativity criterion	.44*	.04	.44*	.04				
(Lack of) Workload Pressure					.52*	.02		
Emotional stability							.49*	**.02**

No association was evident in this organisation for the *Openness* and *Conscientiousness* dimensions of personality in relation to idea generation and implementation. However, highly statistically significant correlations are evident between *Openness to experience* and the KEYS *Creativity* criterion (r .47, p <.01) and to a lesser extent for *Extraversion* with *Productivity* (r .37, p <.05).

Statistically significant bivariate correlations of KEYS scales with criterion scales (Table 16) illustrate the contribution of two Tier 1 and two Tier 2

scales to *Creativity*. However, stronger and, in most cases, more highly significant relationships are suggested with the *Productivity* criterion.

Table 16 Company 3: Intercorrelations between KEYS scales

	Creativity	Productivity
Organisational Encouragement	.383*	.484**
Work Group Support	.424*	.580**
Challenging Work		.636**
Supervisory Encouragement	.436*	.364*
Freedom	.405*	
Sufficient Resources		.582**

This analysis supports the MD's suggestion that this company is currently not creative in the slightest, but should be. Although later qualified as relative to the sector in which the company operates, suggesting staff are actively encouraged to come up with new ideas, this is not evident from respondents' perceptions. Quantitative and qualitative analysis suggest that there is a lack of shared meaning of what it means to be creative and innovative in this company and a lack of understanding of how to achieve this in practice across all levels and functions. Yet, creativity can evoke ambiguity and interpretation as couched in a very interesting statement made by the Group MD,

> "They [the workforce] always knew that having good ideas was desirable but they might not necessarily associate that with the word creativity."(Company 3.1.87)

To summarise, Company 3 is allied to the world of advertising and marketing, traditionally creative industries, yet considerable uncertainty exists about aspirations to creativity and innovation. This is apparent from both interviewees and from analysis of climate for creativity. Most scales fall between mid-range and very low relative to KEYS norms, with the notable exception of (Lack of) Work Load Pressure that is high, particularly for management and administrative staff, perhaps excessively. Again, with the exception of management and administration, little variation exists between the operational functions,

Client Services and the Business Unit. While 'creativity' is welcomed, there is no active encouragement or support. It is unsurprising that *Creativity* is low and relationships with KEYS scales weak, although stronger for *Productivity.* Indeed *Organisational attitudes, structures and procedures* are reported as inhibiting and necessary to improving creativity and innovation.

4.2.3 Company 4: Background

Company 4 represents the European laboratory of a worldwide research and development community with which there is extensive cooperation consistent with the long-term digitally orientated growth strategy, which includes a focus on optoelectronics, materials research and imaging software. This site is responsible for identifying unique science and technology and discovering new opportunities that serve the needs of the diverse and increasingly digital European markets. This team aims to ensure that Company 4 continues to be a world leader in developing the most technologically advanced and customer friendly imaging products. Development of the facility demonstrates company commitment to taking advantage of European innovation in the determination to remain at the forefront of technological advances in digital imaging and display technology.

4.2.3.1 *Case study sample*

At the time of data collection Company 4 employed approximately 25 staff plus 8-10 temporary staff, organised in a very flat structure all reporting to the Director. Although 2-3 staff have extra responsibilities as Senior Managers, no staff formally report to them following relatively recent downsizing from 300 staff in early 2006 when they moved to the current site. One of the Senior Managers agreed to participate in an interview in July 2007.

4.2.3.2 Summary of Interviews

Interview 1

The Operations Manager/Photographic Programmes Manager confirmed that as a research organisation, creativity and innovation are vital, rating the desirability, expectation of, priority afforded and value all at 7 on the 7-point scale. Asked whether he differentiated between the terms, interviewee 1 clearly responded that creativity is the generation of ideas and innovation the exploitation of creativity, although he suspected that among the staff the terms are used interchangeably. Asked to explain what creativity and innovation mean in the context of the company the interviewee suggested that one of the main problems they currently face is actually trying to make money out of digital imaging and they tend to unearth creative ideas by,

> "taking external input, mixing it with some background knowledge of our own, possibly from reading journals as well, and what comes out gradually moves from a creative idea to an innovative project ... it really pays you to look at the periphery of your normal area ... that a lot of ideas and a lot of disruption comes from those boundaries between areas" (Company 4.1.59)

In respect of mechanisms for sustaining creativity, at the time of this interview this manager suggested that he and a colleague had recently initiated a creativity club (Company 4.1.119) comprising four founder members who invite people in from different areas and specialisms as appropriate to develop ideas and solutions around actual workplace problems. Training in creative problem solving techniques was also underway, although as a research and development organisation there has always been a culture where traditional brainstorming techniques are employed. He strongly believed that the potential to be creative exists in all departments, across all levels and job functions and agreed that some people have greater potential to be creative than others, although on this

point clearly the interviewee had unresolved issues on the nature/nurture debate.

Interview 2

The second interview took place with a female staff member. One of her roles is championing creativity and, jointly with interviewee 1, is initiating the creativity clubs. Her perspective on creativity in Company 4 differed somewhat to that of the first interviewee. While, creativity and innovation were considered highly desirable, 7 on the 7-point scale, the expectation of, priority afforded and value were rated rather lower, all around a 5 on the scale on the basis that these tend to fluctuate depending on what is happening in the organisation and externally. Citing current changes as an example, she suggested that at such times people tend to get a bit blasé about new ideas, explaining that following the move to Cambridge there was a honeymoon period that saw a huge push on bringing in new ideas,

> ".. that was very exciting and dynamic; it was the most fun that it's been here really." (Company 4.2.50)

Elaborating on recent changes she explained that there had been further reorganisation of research stemming from Company 4's USA Head Office within the previous month. Participants completed questionnaires prior to these changes and, therefore, this is unlikely to have influenced perceptions.

Asked about the meaning of creativity and innovation and the need to differentiate, creativity was described as new ideas and innovation as delivery (99). Elaboration of creativity focussed on fun and freedom of all to voice ideas without fear of intimidation or humiliation and the key problem of the need to avoid premature judgement (Appendix 4.2.100). This very much reflects her role as creativity champion and the energy and enthusiasm,

> "I think I'm trying to create a culture where they can have fun! It's Ok to be wrong ... it's Ok to say something completely and utterly stupid ... I love the intermediate impossible one's ... we're going to run the Superheroes tomorrow... I think those are fantastic because you have to be ridiculous ..." (Company 4.2.134)

However, Interviewee 2 also highlights the problem of getting new ideas implemented, which often means displacing a different project and suggests the significance of persuasion, persistence, power and influence (Company 4.2.144-203). She firmly believes that the potential to be creative exists in all departments and job functions and across all levels and roles, citing self-efficacy and perceived influence as the important factors, although disagreed that some individuals have greater potential to be creative. An extract from this interviewee's response when asked if there is anything else she would like to add is quoted below, and clearly highlights the nature of the creative process and the importance of domain specific knowledge and expertise:

> "I think it's a balancing act of encouraging creativity whilst having fun and having the processes in place to make it fair, to encourage people to participate... structure over chaos ... I don't believe in stage-gates and funnels early on ... it's fuzzy front-end, it should be fuzzy, it should be chaotic ... but then some people with authority get to spend more than others, scientific credibility seems to have greater influence – earned power, maybe, over new ideas from younger scientists?" (Company 4.2.220)

4.2.3.3 Questionnaires

Of 33 sets of questionnaires distributed, 27 were completed, giving an excellent response rate of 82 percent, 40 percent aged under 35, sixty percent over. Homogeneity of the workforce is apparent in terms of qualifications, 92.5percent qualified to at least first degree level, 55percent

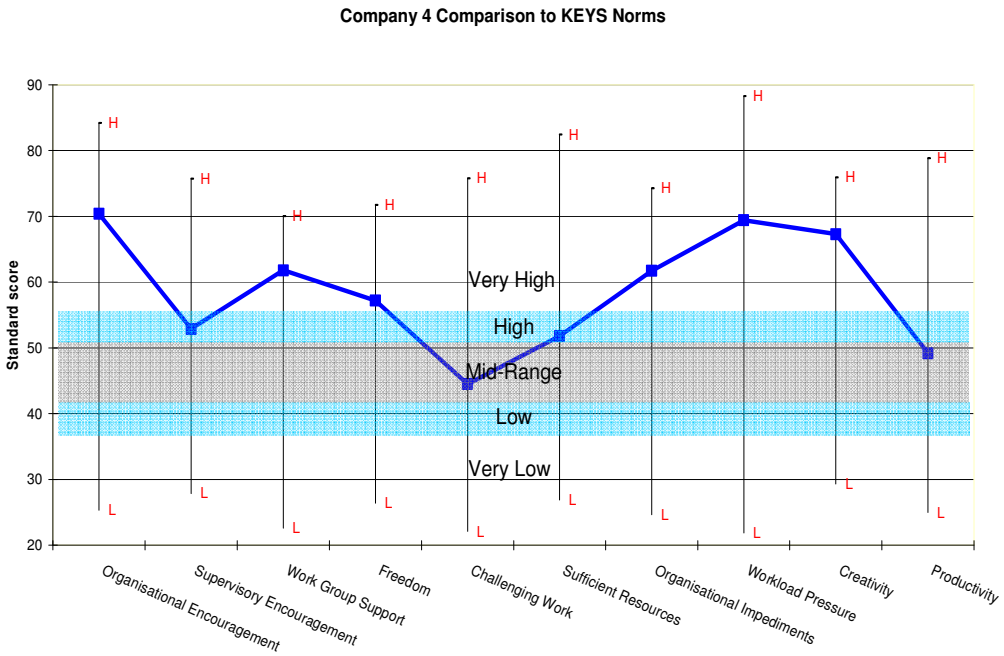
holding Masters or Doctorates predominantly in science/engineering and with the ratio of 74percent male to 26percent female. Seventy percent of respondents reported having some training in creative problem solving.

General agreement was evident between self and supervisor ratings of creativity although with a tendency for supervisor ratings to be somewhat lower. Approximately 60-70 percent of respondents' estimates for individual and group idea generation and implementation fell into the range 1-50 across all categories. The three most frequently reported reasons for non-implementation were *not highly valued, low priority* and *cost.* In respect of what it means to be creative and innovative, the most frequently reported categories were *novelty/originality* and *identifying new opportunities.*

KEYS: Assessing the climate for creativity

Responses were generally very positive and conversion to standard scores (Figure 4-15) clearly illustrates five of the scales as very high, comparing extremely favourably to KEYS norms. *Challenging Work*, a Tier 1 stimulant scale is low, and the *Productivity* criterion in mid-range.

Figure 4-15 Company 4:Comparison to KEYS Norms



Two of these are Tier 1 stimulant scales, *Organisational Encouragement* and *Work Group Support*. Analysis of scale items provides important insight into employees' perceptions of the organisational climate. For *Organisational Encouragement* several items are mid-range including shared vision, top management expectation of creative work, top management enthusiasm for their projects and encouragement of risk. For *Work Group Support* items perceived less positively and falling into the mid-range include commitment, challenging of ideas and a good team. The third of the Tier 1 scales, *Challenging Work*, is low relative to KEYS norms. However, subsequent discussions revealed this as likely to have been temporary response to recent US changes.

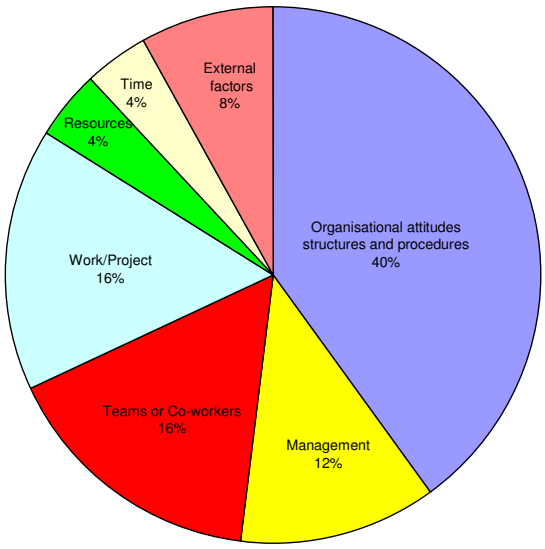
Scale item analysis of *Supervisory Encouragement*, a tier 2 stimulant scale, reveals enormous variability between items. Low or very low include clear goals, constructive feedback and the value of individual contributions. However, it is likely that this is a reflection of the extremely flat, matrix-style structure of the organisation. *Freedom*, another Tier 2 stimulant scale is high overall although two mid-range items are autonomy in deciding how to carry out projects and pressure to meet others' specifications on how to do the work. These perceptions might suggest excessive control with too little supervisory support. Finally in Tier 2 is the obstacle scale, (Lack of) *Organisational Impediments* that is very high. Again, several items are perceived less favourably including strict control by upper management, overly formal procedures and structures and risk avoidance by top management. *Sufficient Resources*, Tier 3, is mid-range with four of the six items perceived negatively. (Lack of) *Workload Pressure* compares favourably to KEYS norms, in the high range and with only one item perceived less favourably; too many distractions from project work. The Creativity criterion is exceptionally high and compares extremely favourably to research and development companies in the KEYS database. *Productivity*, on the other hand, falls only into the mid-range and little variability between items is demonstrated.

KEYS Section II: Checklist Items

Each of the questions in this section is based on analysis of useable data from 25 respondents. Responses to the question what is the single most important factor supporting creativity and innovation in your current work environment are summarised in Figure 4-16. Four categories together encompass 84percent of responses, demonstrating clear support.

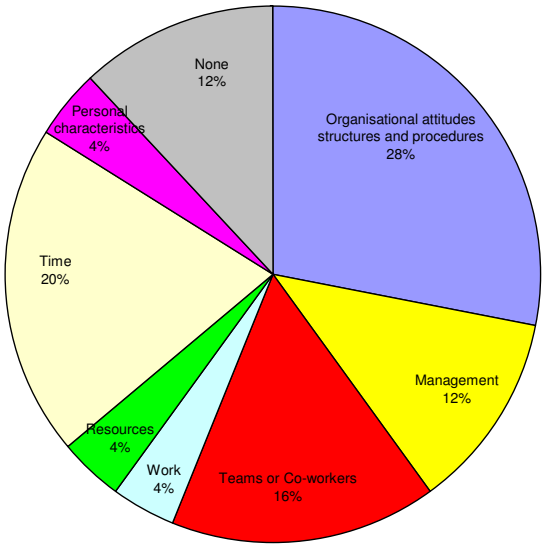
Similarly, responses to the question what is the single most important factor inhibiting creativity and innovation in your current work environment are summarised in Figure 4-17. Therefore, while some aspects of the work environment are seen as supporting creativity, for example, communication, collaboration and *openness* to new ideas, others, mechanisms for developing new ideas are seen by some as supportive while others perceive a lack of such mechanisms inhibiting creativity.

Figure 4-16 Company 4: Most important factor supporting creativity and innovation?



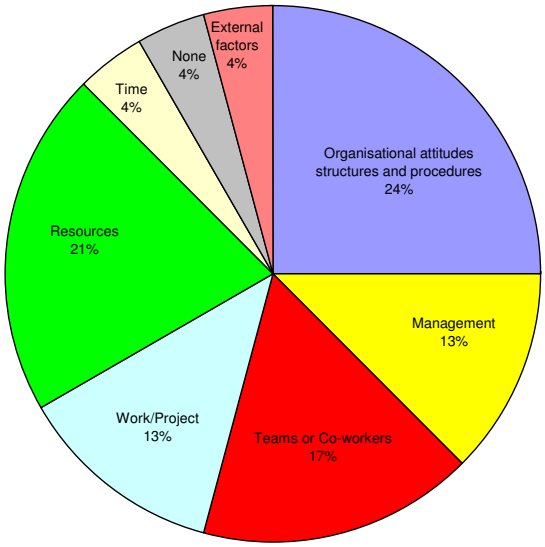
Organisational attitudes, structures and procedures	%	Teams or Co-workers	%
Communication/collaboration	16	Good communication/*openness*	4
Openness to new ideas	16	Support	4
Mechanisms for developing new ideas	8	Constructive debate	4
Management	%	Personal characteristics/abilities	4
Encouragement/support from immediate supervisor	12	Work/Project	%
Time or Workload	%	Interesting work	12
Sufficient time	4	Clear goals	4
External Factors	%	Resources	%
Competitive industry	8	Money	4

Figure 4-17 Company 4: Most important factor inhibiting creativity and innovation?



Organisational attitudes, structures and procedures	%	Teams or Co-workers	%
Mechanisms for developing ideas	4	Poor communication/ *openness*	4
Lack of encouragement/support from other groups	4	Unconstructive debate	4
Mechanisms for implementing ideas	12	Personal characteristics	8
Rigid procedures	4	Time or Workload	%
Risk avoidance	4	Insufficient time	12
Management	%	Too much work	4
Lack of support from supervisor	4	Too little work	4
Lack of support from upper management	4	Work/Project	%
Lack of clear vision	4	Lack of clear goals	4
Myself	%	Resources	%
Personal characteristics	4	More tools	4

Figure 4-18 Company 4: Most important suggestion for improving the climate?



Organisational attitudes, structures and procedures	%	Teams or Co-workers	%
More support from other groups	4	Improve characteristics	8
Better communication/collaboration	4	More support	8
Better mechanisms for implementing ideas	8	Work/Project	%
Less fear of risk	4	Clearer goals	8
Mentoring	4	More autonomy	4
Management	%	Resources	%
Encouragement/support from upper management	4	More tools	4
Encouragement/support from supervisor	4	More people	4
Clearer vision	4	More money	4
Time or Workload	%	More information	4
More time	4	More training and development	4
		External factors	%
		Clearer customer requirements	4

Suggestions for improving the climate for creativity, Figure 4-18, appear less well-defined, responses spread across many categories and typical of an organisation that is supportive of creativity and innovation.

Relationships between factors

For the outcome measures of individual and group idea generation and implementation no significant relationships are apparent for the Tier 1 stimulant scales, *Organisational Encouragement* and *Work Group Support* or with the *Creativity* criterion scale. Significant correlations are evident the *Challenging Work* scale with group implementation of ideas although this might be influenced by the suggested ephemeral positioning of this scale in the low range. (Lack of) *Organisational Impediments* is associated with both individual and group idea generation, highly for the latter, but not with implementation. The relationship between *Sufficient Resources* and individual implementation is negative, a possible explanation of which is that greater implementation raises awareness of resource limitations?

In respect of personality, *Extraversion* is the only dimension suggested as associated with this set of outcomes, and only with implementation of ideas, which reinforces comments in the second interview. The split between those high and low on *Openness to experience* was almost 50:50 and there appears to be no relationship with any outcome measures. Company 4 demonstrates a relatively homogeneous sample (i.e. highly educated, predominantly male scientists) and there appears little in the way of individual characteristics that might explain any variation.

Table 17 Company 4: Relationships between outcome measures

	Individual		Group	
	Ideas	Implementation	Ideas	Implementation
	r	r	r	r
KEYS *Challenging Work*				.496*
(Lack of) Organisational Impediments	.512*		.728**	
Sufficient Resources		-.450*		
NEOFFI *Extraversion*		.543**		
*Correlation is significant at the 0.01 level; *Correlation is significant at the .05 level				

In respect of the *Creativity* and *Productivity* criterion correlations with KEYS stimulant and obstacle scales are illustrated in Table 18. As would be expected, a highly significant correlation exists between the two criterion measures (r = .678, p< .01), although important differences are highlighted in this company where *Creativity* is Very High and *Productivity* is Mid-range relative to KEYS database norms. All three Tier 1 scales are very highly correlated and significant relationships are also suggested with two Tier 2 scales. As such this represents a good illustration of a highly creative company.

Table 18 Company 4: Intercorrelations between KEYS Scales

KEYS Scales	Criterion	
	Creativity	*Productivity*
Stimulants		
Organisational Encouragement	.717**	.770**
Work Group Support	.729**	.627**
Challenging Work	.743**	.674**
Supervisory Encouragement	.447*	.570**
Freedom	.398*	.251
Resources	.298	.353
Obstacles		
(Lack of) Workload Pressure	-.225	-.516**
(Lack of) Organisational Impediments	-.386	-.550**

There are, of course, differences. For example, *Challenging Work* was at the time of data collection low and *Supervisory Encouragement* appears less significant in a non-hierarchical organisational structure. The relationships with *Productivity* are very similar although *Freedom* is not suggested as significant. The main difference is the suggestion of negative relationships for both obstacle scales with both *Creativity* and *Productivity*. As (lack of) obstacles this should not be the case. It is highly unlikely that *Creativity* and *Productivity* increase where more obstacles are

perceived! The most likely explanation is that those who are more highly Creative and Productive have greater awareness of obstacles.

To summarise, creativity is vital to financial exploitation of innovations in research and development of Company 4 regardless of downsizing by 90 percent. Mechanisms are in place to support creativity and innovation and 70 percent of staff are trained in creative problem solving techniques. Relative to KEYS norms, this company is highest on *Creativity* and represents the most textbook and fun approach based on both interviews and staff perceptions as reported by KEYS. Five scales fall into the very high range, and two high leading to *very high Creativity.* Transient conditions lead to reporting of *Challenging Work* as only mid-range. Highly significant relationships are apparent for KEYS scales with criterion scales supported by checklist items in section II of KEYS.

4.2.4 Company 5: Background

At the time of data collection Company 5 had operated as an independent commercial business for 10 years and had established a worldwide reputation for providing customer satisfaction through innovative engineering solutions.

4.2.4.1 *Case study sample*

The company then employed 45 staff across three departments, Aerospace Engineering, Safety and Suitability Technologies (SST) and Unmanned Air Vehicle (UAV) Systems, in addition to the support Centre.

4.2.4.2 Summary of Interview

A semi-structured interview was conducted with the Managing Director in 2007. Initial discussions of research aims and objectives prompted interesting discussions around creativity and innovation from which the formal interview extended. The MD confirmed that quality innovation is a very important part of the business, emphasised in the company's strap line and an integral part of its strategy:

> "it's what we do and always has been what we do since we were set up in 1997."(Company 5.1.26)

Desirability, and *value* of creativity and innovation were both rated at the top of the 7-point scale with the *expectation* of and *priority* afforded slightly lower rating of 6. A strong need to differentiate between creativity and innovation was expressed. In the view of the MD the latter was referred to as central to the business while emphasising the need to innovate the right things for the market and inherent problems of the non-acceptability of risk in the industry (5.1.41). Support for creativity and innovation are informal (5.1.79) rather than formal and stressing the importance of specialised training. The interviewee strongly agreed that some people have greater potential to be creative (5.1.100) but only moderately agreed that the potential to be creative exists across all jobs, levels and functions (5.1.109). The full interview transcript elaborates on these points,

> "It's very tempting in a study like this to come up with the conclusion that there are a number of things that management could do and I'd probably buy 9/10 of them. There could also be the conclusion that jobs/people could be more creative. There is a counter point If you encourage people to be creative, if you would like things to be done right, there are some jobs where there would be an additional risk. From a management perspective you don't want to have a creative boost without the inherent risk. If we all get excited, you need to be sure about new risks. The directors could go to jail. A sensible, balanced judgement, avoiding unnecessary risk. If I were a patient in hospital ... save your creativity for the next patient ...." (Company 5.1.124)

4.2.4.3 *Questionnaires*

Of 45 questionnaires distributed 24 were returned, a response rate of 53percent. More than 79 percent of respondents were aged 35 years or over and of whom 62.5 percent reported having more than 20 years'

overall work experience. More than 50 percent of participants had worked for the company 10 years or longer. The gender split of participants was 75:25 male to female and reported functions were 42 percent administration/ management and 38 percent engineering/product development. Participants reported hierarchical levels as 58 percent Middle, the remainder distributed among upper middle and first level. One-third of participants reported their highest educational qualification as a Bachelors degree, relatively few reporting postgraduate qualifications at the level of a Masters or Doctorate, although one-third of participants failed to answer this question. The educational discipline of most participants (62.5 percent) was science/engineering. The majority of respondents (87.5 percent) had experienced no training in creative problem solving. Considerable agreement was evident between self and supervisor ratings although, surprisingly given the reputation and strap line, very few fell into the high category.

Participants' estimates of individual and group ideas generated and implemented ranged from 0 – 137. More than 70 percent fell into the range 0-10 across all outcomes, somewhat surprising given the strap line and claims of the MD. These questions prompted some interesting comments that potentially provide additional qualitative insight on their individual perceptions. For example, one participant suggested *"Hundreds"* for individual and group ideas, and *"Most"* for implementation both at the individual and group levels. Annotation by this individual designer suggested:

> "It's impossible for me to answer for several reasons. During the conceptual design phase of jobs just about every idea any of us have, related to the job, is creative. Whether in a group situation or on your own it still takes an individual to have the idea. The group may wish to expand the idea but it still came from an individual."

Another participant, in Quality Assurance, suggested that at an individual and group level *"many"* ideas are generated but *"few"* are implemented.", again suggesting a lack of alignment between the perceptions of the MD and those of the staff. In respect of reasons reported for non-implementation *low priority, cost* and *risk* featured most prominently. In response to what it means to be creative and innovative the most frequently reported categories were *fresh perspectives, challenging preconceived ideas, identifying new opportunities* and *appropriate.*

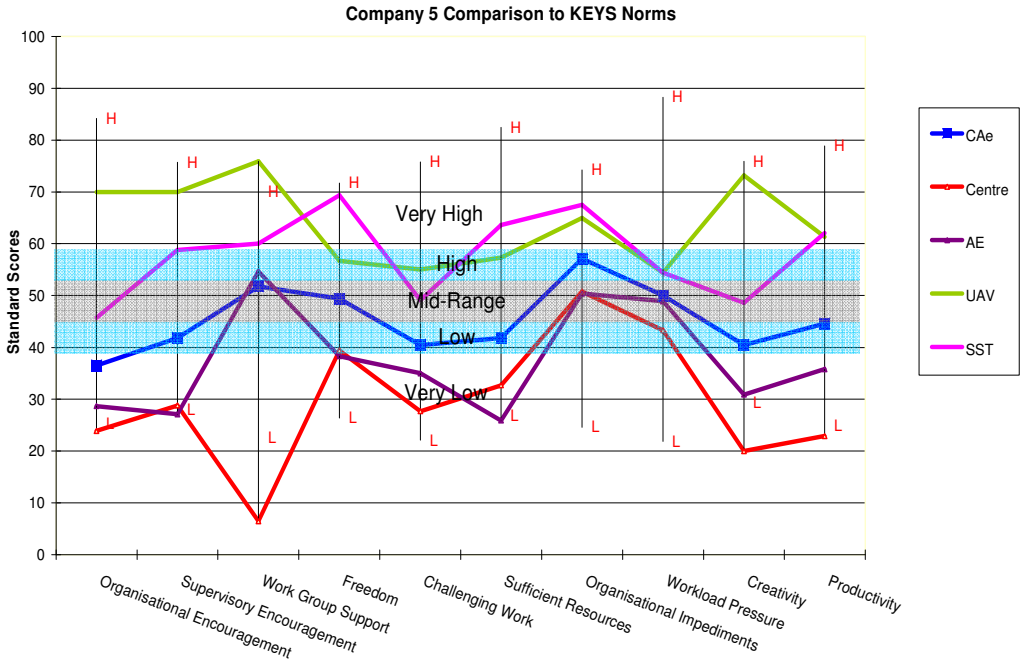
Analysis of KEYS: Assessing the climate for creativity

Figure 4-19 shows standard scores for Company 5 from which it is clear that results are mixed. For the company as a whole the only scale falling into the 'high' range is (Lack of) *Organisational Impediments*. Scores for three scales fall into the 'mid-range'. Two are environmental stimulants, *Work Group Support* and *Freedom*, the third an obstacle scale, (Lack of) *Workload Pressure*. Of the four remaining stimulant scales, three fall into the 'low' range, *Supervisory Encouragement*, *Challenging Work* and *Sufficient Resources*, while *Organisational Encouragement* is 'very low'. Tier 1 scales (*Work Group Support*, *Challenging Work* and *Organisational Encouragement*) range from mid-range to very low. One Tier 2 scale is high (*Lack of Organisational Impediments*), the other two are low (*Supervisory Encouragement* and *Freedom*). Tier 3 scales (Lack of *Workload Pressure* and *Sufficient Resources*) are mid-range to low. Staff perceptions are very different to those of management. It is unremarkable, therefore, that the criterion scales, *Creativity* and *Productivity*, both fall into the 'low' range.

Initial assessment of the overall climate for creativity would therefore broadly seem to suggest a lack of support for creativity and innovation rather than obstacles that inhibit such behaviour. This is in direct contrast to qualitative data elicited from the interview with the MD. Analysis at a departmental level, illustrate the support Centre and AE are less positive across most scales than those in UAV and SST. Scale item analysis reveals variability

that might be masked by overall scores and highlights specific areas of interest to enhancing the organisational climate to provide greater support for creativity and innovation.

Figure 4-19 Company 5: **C**omparison to KEYS Norms



In respect of *Organisational Encouragement* for the company as a whole more than half of the 15 items are very low. These relate to the encouragement of new ideas, fair performance evaluation, top management expectation of creative work, recognition, reward, mechanisms for new ideas, encouragement of risk and top management enthusiasm about workers' projects. UAV are more positive than the other departments. On *Challenging Work* again there is much variability between departments, mid-range for UAV and SST and low for AE and the Centre. In terms of a perceived urgent need by the organisation for completion of the work only Aerospace Engineering responded positively. *Work Group Support*, presents a different picture, most groups mirroring that for the overall company. Therefore *Organisational Encouragement* and *Challenging Work* potentially appear problematic across three of the four departments of the company.

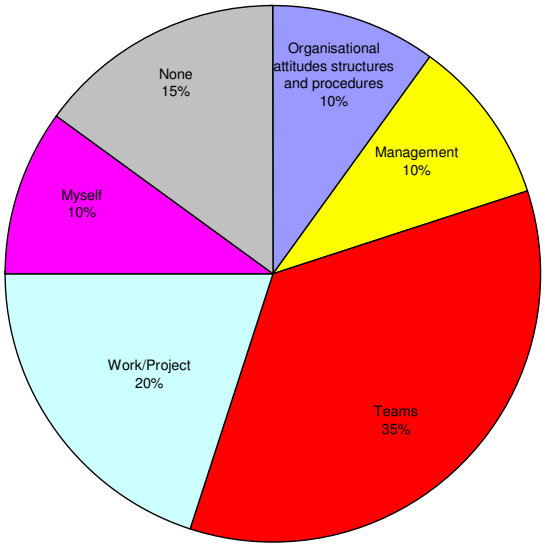
Of Tier 2 stimulants, *Supervisory Encouragement* is low, *Freedom* is mid-range and, an obstacle, (Lack of) *Organisational Impediments* is high. On *Supervisory Encouragement*, variation exists by department with the Centre and AE appearing less supportive. However, the pattern of items across departments is quite similar. Items that are very low for all departments include the clear setting of goals and constructive feedback. For three departments these include planning and *openness* to new ideas. On the *Freedom* scale, that represents autonomy and control, AE is the only department with items in the low range. While (Lack of) *Organisational Impediments* is high overall there are notable deviations for the Centre in terms of strict control, doing things the way we always have, protecting territory, negative criticism and being critical of new ideas. For AE pressure to produce regardless of quality, risk avoidance and destructive criticism feature negatively. For *Sufficient Resources* the Centre and AE fall into the very low range while UAV and SST reflect more positivity. Departmental comparisons reinforce the relative (lack of) *Workload Pressure* scales. The *Creativity* criterion scale is very low for the support Centre and AE, and mid-range for SST, UAV being the only department where this is very high. Item analysis indicates that perceptions of their area of the organisation as creative and innovative are very high for UAV but very low for other departments. Perceptions that a great deal of creativity is called for in the work is low across all departments.

KEYS Section II: Checklist Items

Figures 4-20, 4-21 and 4-22 illustrate analysis of useable data from 20 respondents for the checklist items in Section II. Supporting creativity and innovation highlights teams and the work itself. Indeed no team or co-worker factors feature as inhibiting or as necessary to improving creativity and innovation. *Organisational attitudes, structures and procedures* attracted only 10 percent of responses, as did *Management,* which is in direct contrast to organisations where the environment is supportive in stimulating organisational creativity and innovation. This reinforces

perceived inhibitory factors where the *Organisational attitudes, structures and procedures* and *Management* categories combine in accounting for 50 percent of responses.

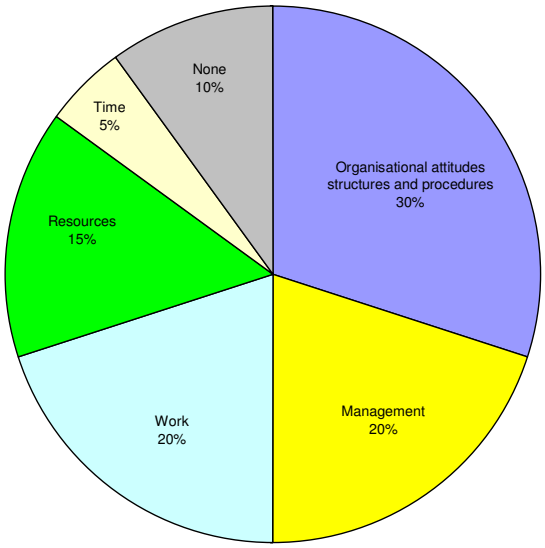
Figure 4-20 Company 5: Most important factor supporting creativity and innovation?



Organisational attitudes, structures and procedures	%	Teams or Co-workers	%
Communication and collaboration around ideas	10	Constructive debate	10
Management	%	Support	5
Encouragement/support from immediate supervisor	10	Personal characteristics	10
Work/Project	%	Good blend of skills	10
Challenging Work	15	Myself	%
Autonomy and *Freedom* in projects	5	Abilities	10

This is further substantiated by participants' suggestions for improving creativity and innovation where these two categories again attract 40 percent of responses, the remainder capriciously spread across a range of other factors. Company 5 clearly represents an organisation where creativity and innovation are at the very heart of what it does, as is apparent from the corporate logo and interview with the MD. Yet this company is one where there appears to be little organisational or management support to stimulate and encourage creative and innovative behaviours.

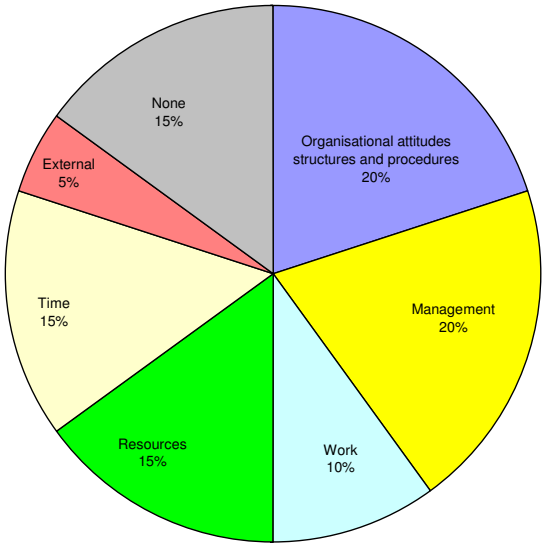
Figure 4-21 Company 5: Most important factor inhibiting creativity and innovation?



Organisational attitudes, structures and procedures	%	Work/Project	%
Lack of rewards for creative work	5	No room for creativity	20
Lack of mechanisms for developing new ideas	5	Resources	%
Lack of trust across the organisation	5	Insufficient people	5
Lack of communication and collaboration around new ideas	5	Insufficient training and development	5
Avoidance of risk	10	Unconducive physical environment	5
Management	%	Time	%
Lack of clear vision by upper management	10	More time	5
Other behaviour of upper management	10		

The workforce comprises specialist engineers, which supports the interactionist and other perspectives on the importance of domain relevant knowledge. In this company expertise, teams/co-workers and the work itself are perceived as supporting creativity and innovation. This appears to be almost to the total exclusion of other factors important to supporting and stimulating organisational creativity and innovation. For example, this is a company with a relatively low proportion of people high on *Openness to experience*, the personality dimension associated with creativity, and within an organisational climate perceived as unsupportive.

Figure 4-22 Company 5: Most important suggestion for improving the climate?



Organisational attitudes, structures and procedures	%	Work/Project	%
More encouragement/support from other groups	5	More *Challenging Work*	5
More reward for creative work	5	Clear goals	5
Improve processes and procedures	10	Resources	%
Management	%	More people	10
Clearer vision by upper management	15	More conducive physical environment	5
More encouragement/support from upper management	5	Time	%
External Factors	%	More time	15
Better customer contact or knowledge	5		

Relationships between factors

No statistically significant correlations exist between the outcome measures of idea generation and implementation at the individual and group levels with any of the KEYS scales or with any of the personality dimensions measured by the NEO-FFI. With reference to psychometric properties of the KEYS survey moderate intercorrelations between the various scales are to be expected in demonstrating similarity and distinctiveness in their contribution to the criterion measures. Correlation of the criterion scales with all other KEYS scales, shown in Table 19 clearly suggests that both *Organisational Encouragement* and *Challenging Work* are highly significant in relation to C*reativity*. *Work Group Support* also appears significant. All three are Tier 1 scales, which are the strongest differentiating factors between high and low creative environments.

Table 19 Company 5: Intercorrelations of KEYS Scales

KEYS Scales	Criterion	
	Creativity	*Productivity*
Stimulants		
Organisational Encouragement	.741**	.678**
Work Group Support	.553*	.634**
Challenging Work	.833**	.476*
Supervisory Encouragement	.473*	.275
Freedom	.343	.501*
Resources	.410*	.581**
Obstacles		
Workload Pressure	-.139	-.269
Organisational Impediments	-.283	-.522**
** Correlation is significant at the 0.01 level *Correlation is significant at the .05 level		

To summarise, innovation is the core business of Company 5 yet support for creativity is weak, regardless of an informal approach as perceived by senior management. This is interpreted as a failure to stimulate and support creativity and innovation that is sustainable. Creativity currently appears to be the result of domain relevant expertise, the work itself and team support rather than any active stimulation and support by management. While acknowledging industry related limitations in respect of risk, this analysis raises questions as to whether the company is sufficiently exploiting its creative and innovative potential. Currently *Organisational Encouragement* is very low, *Challenging Work* is low and *Work Group Support* is mid-range relative to KEYS norms. However, interpreted alongside significant associations between scales strongly suggests that enhancement of the organisational climate is likely to stimulate the creativity that the company aspires to and which should be a central part of what they do, based on the history of the company, its strategy and strap lines. Variability is evident between departments perceived as more or less supportive of creativity that demands further investigation prior to intervention.

4.2.5 Company 6: Background

Company 6 is a leading corporate communications agency that claims more than a decade of experience using core skills in journalism, design, powerful online channels and strategy development, delivering innovative ideas and flawless customer service. The company portfolio includes

newsletters, newspapers, magazines, intranets, websites, e-magazines, video and pod casts. The company website suggests:

> "We recruit excellent people. Their experience, ideas and expertise create exceptional communications products that deliver real impact and value. Unlike other agencies, Headlines' journalists, designers and account managers sit and work together in customer-focused teams – ensuring clear communication and a seamless approach to delivering every brief."

4.2.5.1 *Case study sample*

At the time of data collection the company employed 25 staff across five teams, reporting to the owner/manager. However, teams were not well defined or represented among the 15 respondents necessitating a holistic approach to this case.

4.2.5.2 *Summary of Interviews*

Interview 1

The first interview was undertaken in late 2007 with the Internal Communications Manager who, at that time, had worked for the company for one-year prior to which she claimed extensive experience in internal communications for very creative London-based companies.

Both *desirability* and *expectation* of creativity and innovation were rated highly by the interviewee (6-7 on a 7-point scale), although the *priority* and *value* afforded were rated lower (5-6 and 4 respectively). Also rated quite highly (5-6) was the agreement that some individuals have a greater potential to be creative and very highly that the potential to be creative exists across all levels, functions and roles and in all areas and departments.

In response to the qualitative questions of what it means to be creative and innovative in practice in this company, creativity was discussed in terms of client solutions and getting the business and later in relation to

journalism and design with a tendency to refer to creativity as 'genius'. However, this interviewee heavily stressed the importance of the boundaries necessary, clearly indicating that they are restricted in being overly creative in design and journalism for effective communication of the message.

This interviewee has some experience of managing to support creativity, although the impression given is that, while there is an expectation of creativity, there is very little in place to enhance or sustain such processes. For example, no real mechanisms are in place to harness creative energies or to manage creativity and, in the year since this interviewee joined the company, there has been no staff training in creative problem solving techniques.

Interview 2

The second interview took place on the same day with the Head of Design and Head of New Business Team:

> "It's funny because, even though you'd expect us to be creative and everything else, we don't actually sit together in a studio or anything. So you've got one in one team and one in another, there's actually two in one team. So it's not that kind of 'buzzy' studio atmosphere you get in a lot of places ... so you have to think about it a lot more and make sure we get together to exchange ideas. So it's quite a challenge really."(Company 6.2.23)

This interviewee elaborated on the very high rating of 7 given to the *desirability* of creativity. The *priority* and *value* afforded to creativity and innovation were also rated very highly at '7' while the *expectation* was rated slightly lower on the basis that some projects require more creativity than others do. This interviewee also strongly agreed that some individuals have a greater potential to be creative and that the potential to be creative

exists across all levels, functions and roles and in all areas and departments.

As a designer this interviewee clearly struggled to define or differentiate between creativity and innovation, referring to creative expression. Indeed the interviewee enthusiastically agreed with the suggestion that she had just described the creativity process and working with closed versus open-ended problems,

> "...my brain goes off down paths and can be all over the place. The original path might lead somewhere else because of the other things I've been thinking about (6.2.184) ... even when I'm lying in bed at night; you know that time before you go to sleep when your brain is just chugging over. I find that quite a good time to come up with good ideas ... for me sometimes its conscious sometimes it isn't. I can train myself to see the outcomes... trial and error... or I might take ideas elsewhere. It's also to do with the information you're given, the brief. We had a lot of information were able to put the pieces together to get a better picture of what it should be. But some clients, it's a bit more flexible, there are so many possibilities. Sometimes you just know it's right, other days you might doodle all day and achieve nothing and then come in the next day with THE idea (Company 6.2.190)."

Asked about supportive mechanisms to harness creative energies, the interviewee discusses the guidance she provides to other designers and confirms a climate that is accepting of mistakes without fear of humiliation. Reinforcing the suggestions of first interviewee that there has been no training in creative problem solving techniques, it is interesting that this interviewee admits to a lack of awareness of such techniques while appears highly enthusiastic about the value in supporting her efforts to train her staff.

4.2.5.3 *Questionnaires*

Of 25 sets of questionnaires distributed 15 were returned, an approximate response rate of 60 percent. Participants comprised two-thirds females and distribution across all age ranges. Approximately 50 percent of participants are qualified to at least first degree level, mainly in the Arts or Business and 60 percent reported having some training in creative problem solving. In terms of tenure, while only a small minority of participants had less than 4 years' overall work experience, two-thirds had worked in this company for less than 4 years.

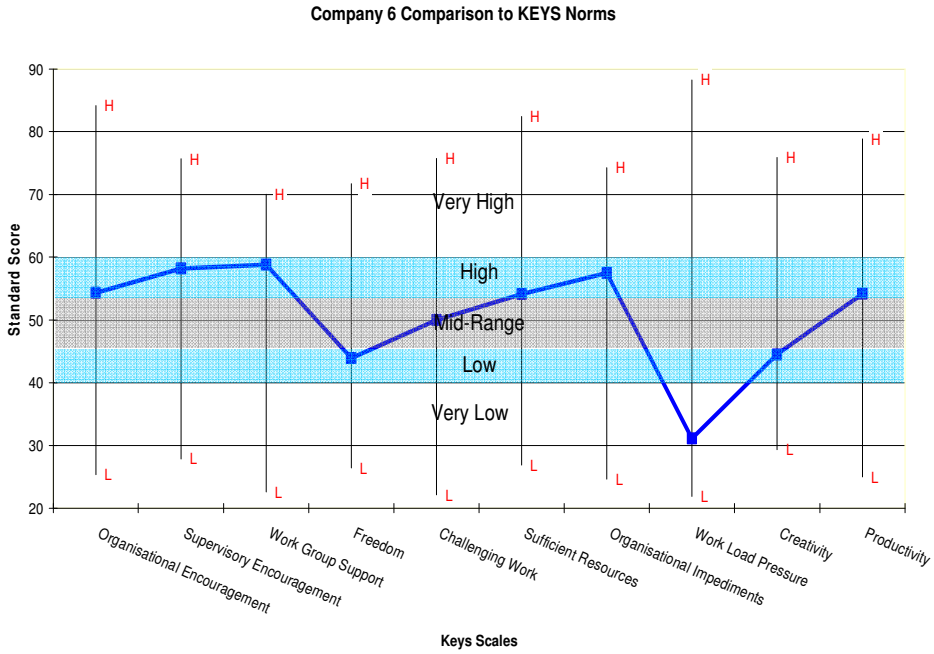
In respect of participants' estimates of individual and group ideas generated and implemented 60-80 percent fell into the range 1-50 across all categories. Broad general agreement was evident between self and supervisor ratings. The most frequently reported reason for non-implementation was *cost. Fresh perspectives* and *challenging preconceived ideas* represented the two most frequently reported categories for what it means to be creative and innovative.

Analysis of KEYS: Assessing the climate for creativity

Conversion of responses to standard scores allows comparison with KEYS database norms, as illustrated in Figure 4-23. For the Tier 1 scales, while participants' perceptions of *Work Group Support* were high, *Organisational Encouragement* and *Challenging Work* both fell into the mid-range. Organisational Environment items reveal variation. Those low or very low include fair performance evaluation, open atmosphere, acceptability of failure, risk taking and reward. Analysis of *Work Group Support* reveals a few mid-range items including a good team, challenging others' ideas, helping others, free and open communication. On *Challenging Work*, this company is mid-range with little variation between items. Of the Tier 2 scales *Supervisory Encouragement* is high overall yet huge variation exists between individual item responses. Items falling into the low range include clear goal setting, poor planning, poor communication and constructive feedback. On the *Freedom* scale, the company is low with

little variation. (Lack of) *Organisational Impediments*, is high, Some items perceived les positively include emphasis on doing things how they have always been done, risk avoidance by top management and hindrance from other areas. *Sufficient Resources* is Tier 3 and falls into the mid-range overall relative to database norms.

Figure 4-23 Company 6: Comparison to KEYS Norms

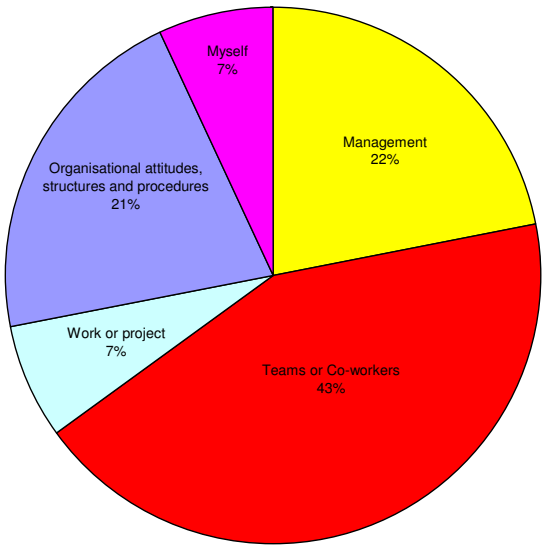


Item analysis reveals variation. Employees perceive three of the six items less favourably, including the availability of resources, budget and data. (Lack of) *Workload Pressure* is very low with little variation between items. This indicates excessive time pressure or workload as inhibiting creativity and innovation. *Creativity* is low and item analysis indicates the work environment as not conducive to individual and group creativity.

KEYS Section II: Checklist Items

Analysis of responses to checklist items in Section II is shown in Figures 4-24, 4-25 and 4-26, based on analysis of useable data from 14 respondents. This profile is of a company that is low on a climate supportive of creativity and innovation. *Teams or co-workers* are the most important factor in supporting creativity and innovation, together with M*anagement* and O*rganisational attitudes, structures and procedures.*

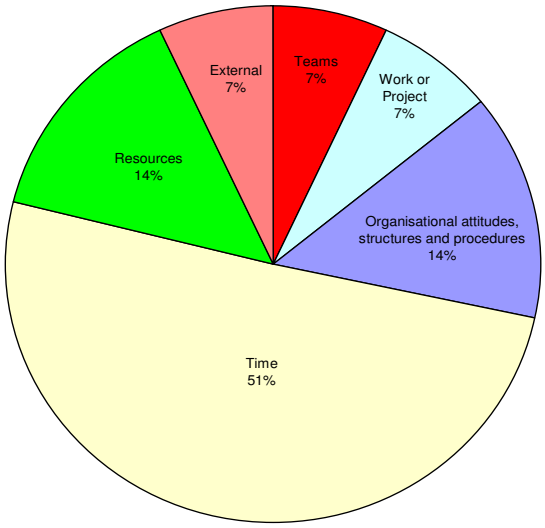
Figure 4-24 Company 6: Most important factor supporting creativity and innovation?



Organisational attitudes, structures and procedures	%	Teams or Co-workers	%
Communication and collaborations around ideas	7	Good communication/*openness* to new ideas	28
Encouragement/support from other groups	7	Personal characteristics	7
Mechanisms for new ideas	7	Constructive debate	7
Management	%	Work or Project	%
Clear vision	7	Autonomy or *Freedom*	7
Encouragement/support from immediate supervisor	14	Myself	
		Abilities	7

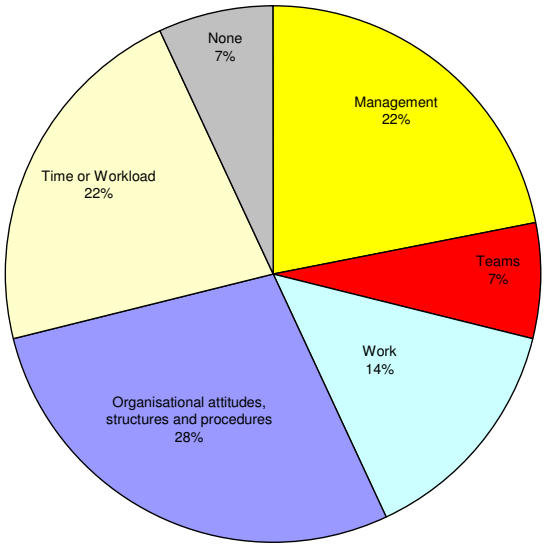
Of factors perceived as inhibiting creativity and innovation, more than half of respondents reported insufficient time. This supports the positioning of the company in the low range on the (lack of) *Workload Pressure* scale.

Figure 4-25 Company 6: Most important factor inhibiting creativity and innovation?



Organisational attitudes, structures and procedures	%	Time or Workload	%
Lack of mechanisms for new ideas	7	Insufficient time	51
Lack of recognition for creative work	7	*Sufficient Resources*	%
External factors	%	Insufficient people	14
Customer requirements	7	Work or Project	%
Teams or Co-workers	%	Lack of clear goals	7
Unconstructive debate	7		

Figure 4-26 Company 6: Most important suggestion for improving the climate?



Organisational attitudes, structures and procedures	%	Management	%
Better communication/collaboration	7	Clearer vision	14
Better mechanisms for ideas	14	Other management behaviours	7
Improve processes and procedures	7	Work or Project	%
Teams or Co-workers	%	More interesting work	14
More constructive debate	7	Time or Workload	%
		More time	22

Relationships between factors

Only three statistically significant correlations exist with a single outcome measure, as shown in Table 20. For the remaining three outcomes no statistically significant relationships were suggested. No statistically significant relationship was evident for the outcomes with any of the five personality dimensions.

Table 20 Company 6 Relationships between outcome measures

	Individual		Group		KEYS
	Ideas	Imp.	Ideas	Imp.	*Creativity*
Supervisor Rating			.778*	.749*	
Self Rating		.620*			**.794****
Educational Level		.657*			
CPS Training		.664*			
** Correlation is significant at the 0.01 level (2-tailed); *Correlation is significant at the .05 level (2-tailed)					

However, explorations of relationships between factors highlight potentially interesting and enlightening factors. For example, supervisor ratings of creativity appear to be significantly correlated with group ideas and implementation ($r=.7$, $p<.05$). Self-ratings of creativity appear highly significant ($r=.8$, $p<.01$) in relation to *Creativity*. Individual implementation of ideas appears to be significantly associated ($r=.6$, $p<.01$) with self-rating, educational level and training in creative problem solving. Intuitively this would seem to be highly suggestive of the importance of self-efficacy to creative and innovative behaviour.

Correlations of the criterion scales with all other KEYS scales, shown in Table 21 suggest that *Work Group Support* (high) and *Challenging Work* (mid-range) are both significantly associated with *Creativity*. However, it is interesting to note that *Organisational Encouragement* is significantly associated with *Productivity* rather than *Creativity*, which supports the scale item analysis and discussion surrounding Figure 4-23, in as much as those items perceived unsupportive are those likely to impact on creativity and innovation rather than *Productivity.*

Table 21 Company 6: Intercorrelations of KEYS Scales

KEYS	Criterion	
	Creativity	**Productivity**
Organisational Encouragement		.637*
Work Group Support	.630*	
Challenging Work	.623*	
Freedom		.614*
* Correlation is significant at the 0.05 level (2-tailed)		

Any relationship between *Creativity* and *Productivity* in this organisation appears highly complex, which is surprising in an environment where creativity is expected. However, this is far from unusual in similar work environments where, all too often, creativity is perceived as aesthetics, often the exclusivity of designers. The lack of any relationship between *Creativity* and *Productivity* is further indicative of such complexities. The contrast between perspectives of interviewees strongly suggests differences between departments. This is a small company and analysis employs a sample of 15 respondents. While KEYS is valid for sub-samples with as few as 3 participants, disproportionate response unfortunately prevented departmental analysis. The overall analysis of this company suggests control and excessive work or time pressures are killing rather than unlocking potential creativity and innovation, as substantiated through analysis of Section II of KEYS.

4.2.6 Company 7: Background

Company 7 represents a very small firm of chartered accountants, established for more than twenty years and with a philosophy that: "aims to bring passion, fun and commitment to our business – and to your business as well" as demonstrated by the extract below from the company's website:

> "Not just another Accountant! Ever noticed how lots of accountants say that they are that little bit different to all the others? Want to meet one that means it? Want to run an idea or a challenge past an independent expert? Want a fresh perspective or another point of view? Want some guidance, support, help or advice on any business

issue? Or even a second opinion? How about some tax advice? Okay so we do all the usual stuff of accounts, audit, tax returns, payrolls, company formation, etc, and do it very well. But, xxx Chartered Accountants also aims to bring passion, fun and commitment to your business as well. A passion to see it and you do more. So we also do the unusual stuff – help, advice and suggestions that work!"

4.2.6.1 *Case study sample*

From a small practice in what might be considered a rather idyllic village location the company employs 8 staff, including the owner.

4.2.6.2 *Summary of Interview*

A single semi-structured interview was conducted with the founder and only fully qualified Chartered Accountant in late 2007 following a response from an article in the University of Bedfordshire's e-zine. The company operates very much as a team and most people are training in accountancy. All are encouraged to come up with new ideas. *Desirability* of creativity and innovation was rated highly at 7, *expectation* 6 and *priority* 5. The interviewee failed to differentiate between creativity and innovation (Company 7.1.137) although, asked for examples, suggested that tax planning requires creativity in helping clients to save money (7.1.153-175). Although actively encouraged, no formal mechanisms are in place to support creativity.

4.2.6.3 *Questionnaires*

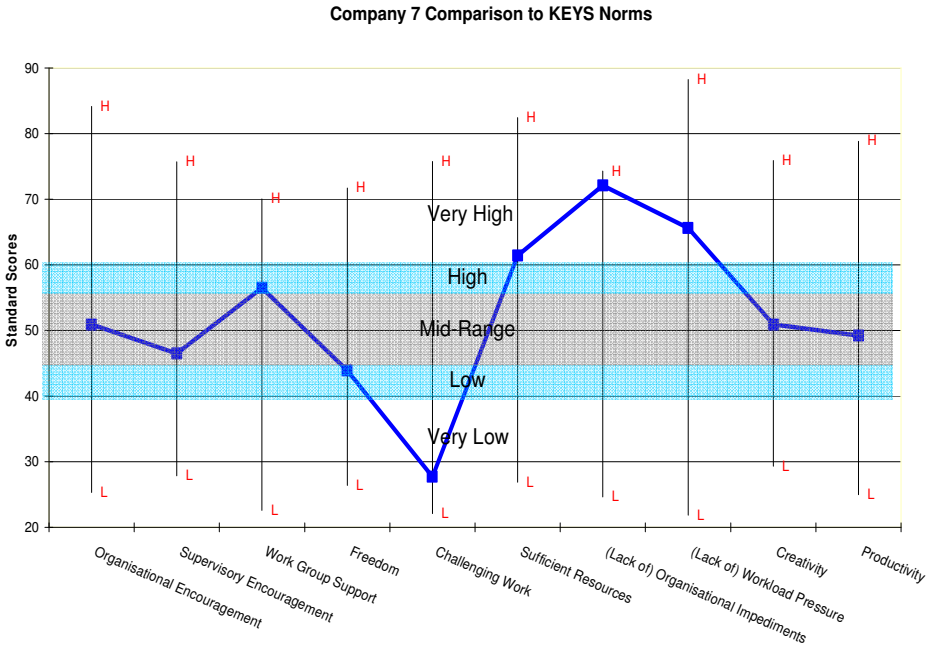
Of 8 sets of questionnaires distributed to employees 6 were returned, a response rate of 75percent. Participants comprised two-thirds females across all age ranges. Two respondents reported their highest educational level as A-level or equivalent, one as Diploma and one as Masters. All reported having no training in creative problems solving. In terms of work experience one-third reported less than 4 years' overall, and two-thirds had worked in this company for less than 4 years. The majority of participants' estimates of individual and group ideas generated and

implemented fell into the ranges 1-10. Two-thirds of participants rated themselves as moderately creative, only one person as low and one as highly creative. The most frequently reported reason for non-implementation was low *priority. Doing things differently* and *fresh perspectives* were reported most frequently as what it means in practice to be creative and innovative.

Analysis of KEYS: Assessing the climate for creativity

Figure 4-27 illustrates that three scales compare favourably to KEYS norms falling into the very-high range, (lack of) *Organisational Impediments*, (lack of) *Workload Pressure* and *Sufficient Resources,* all demonstrating little variation between items. *Work Group Support*, a Tier 1 stimulant scale, is high. *Organisational Encouragement* and *Supervisory Encouragement* are both mid-range as are the *Creativity* and *Productivity* criterion.

Figure 4-27 Company 7:Comparison to KEYS Norms



However, *Freedom* and *Challenging Work* are low and very low respectively. For *Organisational Encouragement* item analysis reveals considerable variation. Those below the mid-point of 50 include an active flow of ideas, top management expectation of creativity, fair judgement of

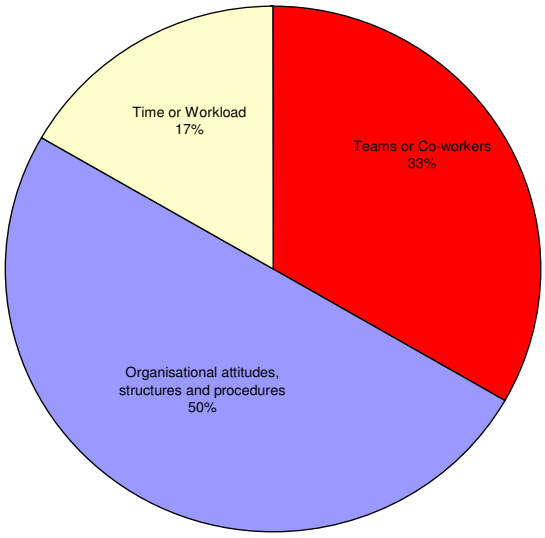
ideas, encouragement to solve problems creatively, reward and mechanisms for new ideas. For *Work Group Support* less positive items include challenging others' ideas, commitment and open communication. On *Challenging Work* little variation exists between items. Huge variation between items is apparent for *Supervisory Encouragement*. Less positive responses include clear goal setting, poor planning, group support, communication and constructive feedback. Considerable variation also exists between items on *Freedom.* Lowest items include freedom to decide how to carry out projects and individual control of one's own work. *Creativity* is mid-range although item analysis indicates considerable variation. Perceptions of the work environment as conducive to the creativity of the work group were very high. However, remaining items were all mid-range or lower. A similar pattern emerges for *Productivity***,** also mid-range. Perceptions of the organisation as productive and effective were less favourable.

KEYS Section II: Checklist Items

Analysis of Section II checklist items based on all 6 participants is shown in Figures 4-28, 4-29 and 4-30. *Organisational attitudes, structures and procedures* are perceived supportive, as are *teams or co-workers*, together comprising 83 percent of responses. In respect of inhibiting factors 4 of the 6 respondents reported *insufficient time or too much work*. However, for the single most important suggestion for improving creativity and innovation, only two respondents referred to time factors. This needs to be interpreted cautiously, particularly as Lack of *Workload Pressure* is very high.

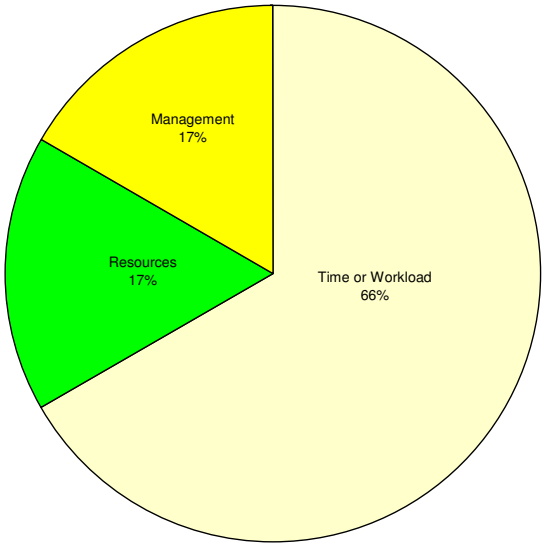
Creativity and *Productivity*, are both mid-range. Areas for improvement, for example, relate to *Challenging Work*, *Freedom*, *Organisational Encouragement* and *Supervisory Encouragement*.

Figure 4-28 Company 7: Most important factor supporting creativity and innovation?



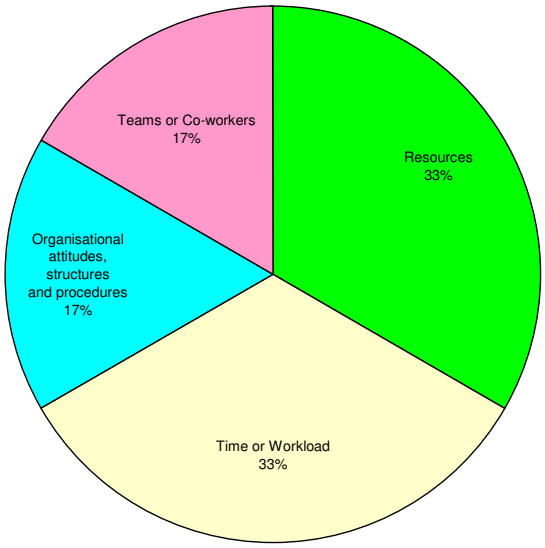
Organisational attitudes, structures and procedures	%	Teams or Co-workers	%
Trust across the organisation	17	Good communication/ *openness* to ideas	17
Communication and collaboration around ideas	17	Personal characteristics or abilities	17
Mechanisms for new ideas	17	Time or Workload	%
		Flexible work schedules	17

Figure 4-29 Company 7: Most important factor inhibiting creativity and innovation?



Time or Workload	%	Management	%
Insufficient time	50	Lack of encouragement/support from supervisor	17
Too much work	16	*Sufficient Resources*	%
		Insufficient people	17

Figure 4-30 Company 7: Most important suggestion for improving the climate?



Organisational attitudes, structures and procedures	%	Time or Workload	%
Break out of the status quo	17	More time	33
Teams or Co-workers	%	*Sufficient Resources*	%
Improve personal characteristics	17	More people	33

Relationships between factors

Table 22 Company 7: Relationships between outcome measures

NEO-FFI	Individual		Group	
	Ideas	Impl.	Ideas	Impl.
Openness to experience	.97**	.98**		
Conscientiousness	-.98**	-.97**	-.81*	
Extraversion	.88*	.84*		
** Correlation is significant at the 0.01 level; *Correlation is significant at the .05 level				

Highly significant correlations are indicated for the *Openness to experience* personality dimension with both individual ideas and implementation at the level of p<.01. While strong correlations are apparent for the *Openness* dimension with both group outcomes, these did not reach the required level of statistical significance. Highly significant negative correlations are indicated for the *Conscientiousness* dimension of personality with both individual outcomes and with group idea generation and, again, while there is a strong correlation with group implementation, this does not reach the required level of statistical significance. Significant relationships are also indicated for the *Extraversion* personality dimension.

The results in respect of *Openness* and *Conscientiousness* are highly supportive of previous findings in relation to the contribution of personality dimensions to creativity.

With reference to psychometric properties of the KEYS survey moderate intercorrelations between the various scales are to be expected in demonstrating similarity and distinctiveness in their contribution to the criterion measures. However, high correlations are likely to indicate the relative strength of a particular scale in stimulating or inhibiting creativity. Correlations of the criterion scales with all other KEYS scales, shown in Table 23, suggests that *Challenging Work* is highly significant and *Organisational Encouragement* is significant in relation to the *Creativity* criterion. However, participants' perceptions of *Challenging Work* are very low and *Organisational Encouragement* is mid-range. Enhancing the work environment on these two factors has potential to improve creativity.

Table 23 Company 7: Intercorrelations of KEYS Scales

KEYS	Criterion	
	Creativity	**Productivity**
Organisational Encouragement	.812*	
Challenging Work	.926**	
Supervisory Encouragement		.853*
Workload Pressure		-.939**
** Correlation is significant at the 0.01 level; *Correlation is significant at the .05 level		

Further, a significant relationship is apparent between *Supervisory Encouragement*, also mid-range compared to KEYS norms, and the *Productivity* criterion that suggests the existence of the potential for improving creativity by enhancing the work environment on this factor. The highly significant negative relationship suggested between (Lack of) *Workload Pressure* and *Productivity* is also perhaps a highly complex one. Lack of *Workload Pressure* compares very favourably to database norms yet, for checklist items time pressures were reported by two-thirds of participants as inhibiting creativity and innovation. Although there is no significant relationship between (Lack of) *Workload Pressure* and *Creativity*, the relationship with *Productivity* appears highly significant yet negative. This suggests that greater *Workload Pressure* is associated with

greater *Productivity*. Some caution is necessary in such interpretations. However, in a company where (Lack of) *Workload Pressure* is very high, yet *Creativity* and *Productivity* are mid-range, this is likely to suggest the significance of optimal degrees of time and *Workload Pressure* in enhancing both.

To summarise, Company 7 is a micro organisation led by an owner-manager who is very high on *Openness* and welcomes creativity and innovation among staff, although shared meaning and support appear not to be realised in practice. Creativity and innovation are not actively encouraged. The positive pressure of Challenging Work and optimal Work Load Pressure both appear lacking and detrimental to creativity and innovation.

4.2.7 Company 8: Background

4.2.7.1 *Case study sample*

Company 8 is a registered charity providing a range of services supporting independent living for people with learning disabilities and employs approximately 150 people across 15 care homes in the London, Hertfordshire and Middlesex regions. Each centre has a Home Manager supported through a small Central Management Team based at the Head Office providing the purposive sample of this investigation. The Chief Executive expressed an interest in the current research following an article in the University of Bedfordshire's e-zine.

4.2.7.2 *Summary of Interviews*

Two interviews were conducted in December 2007, one with a Home Manager and one with the Head of Care Services based at the Head Office. Considerable overlap was evident and a combined summary avoids repetition. Both interviewees were highly enthusiastic about and committed to their work and clearly value creativity in improving service provision for those with learning disabilities, for whom the aim of the organisation is to provide a home for life wherever possible. One of the

interviewees suggested that each of their service users has 'a tiny bit of me in them'.

Person-centred plans were discussed by both interviewees. While not new and subject to regulation, both are passionate about in empowering service users to make some choices and decisions themselves (Company 8.1.49; 8.2.44). For example, it was made possible for a woman with mobility and anxiety problems and who cannot self-medicate to fulfil her dream of swimming with dolphins (8.2.53). Another example, this time hypothetical, allowed a man with mental health problems, and who again could not self-medicate, to be supported in fulfilling his dream to travel around Scotland in a camper van, using mobile phones, route planners and contacts with local clinics en route (8.2.126). The organisation also firmly believes in empowering staff and supporting them at all levels to be creative and innovative and examples were provided of management, supervisor and team away days (8.2.116). A simple yet meaningful example provided was the introduction of a pictorial system as a means of effectively communicating and reinforcing past, present and future activities with service users (8.2.88).

4.2.7.3 *Questionnaires*

Of questionnaires distributed to all 35 Managers and Supervisors in the Head Office and each of the 15 homes, 15 useable sets were returned, 1 from Head Office and 14 from the homes, representing an overall response rate of 43 percent. Two-thirds of respondents were female and more than 87 percent were aged 35 or over. Of the 11 respondents that reported their highest educational level there was a spread between A level, Diploma, Bachelors and Masters degree. Educational disciplines reported Business, Science/Engineering and Social Sciences. In respect of tenure, distribution was between 0-4 years, 5-10 years and 10 years or more. Considerable differences are evident between self and supervisor ratings of creativity.

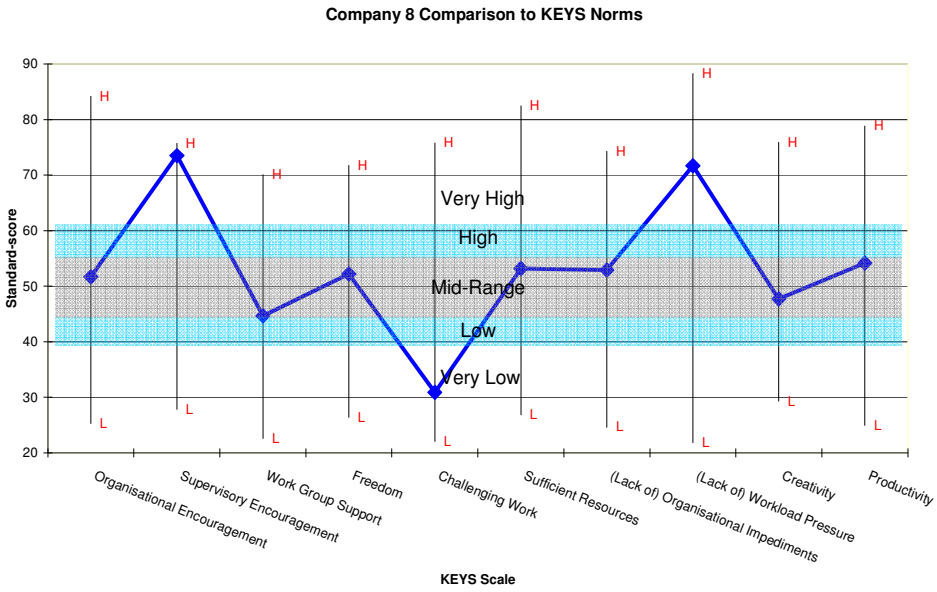
In respect of participants' estimates of individual and group ideas generated and implemented the majority across all categories fell into the range 1 - 10. Only 4 (27 percent) respondents reported ever having participated in any type of creative problem solving training although, with possibly one exception, these individuals failed to report a greater number of ideas. Indeed three of the four highest self-reports of idea generation were elicited from participants who had received no such training. *Low priority* and *cost* were the most frequently reported reasons for non-implementation. *Fresh perspectives* and *identifying new opportunities* were reported most frequently as what it means to be creative and innovative.

Analysis of KEYS: Assessing the climate for creativity

Standardised scores allow comparison with KEYS norms, as shown in Figure 4-31. Participants' perceptions of *Supervisory Encouragement* and (Lack of) *Workload Pressure* are very high. However, other scales compare less favourably, six (*Organisational Encouragement*; *Freedom*; *Sufficient Resources*; (Lack of) *Organisational Impediments*; *Creativity* and *Productivity* criterion) falling into the mid-range. (Lack of) *Work Group Support* is low and *Challenging Work* very low.

For *Organisational Encouragement* item analysis reveals considerable variation. Less positive items include an active flow of ideas, top management expectation of creativity, reward and recognition, encouragement to solve problems creatively, fear of looking stupid, and encouragement to take risks. *For Freedom*, some variation exists, less positive items including freedom to decide how to carry out projects and pressure to meet others' specifications, although responses might reflect the type of work required of home managers and supervisors. (Lack of) *Organisational Impediments*, a Tier 2 obstacle scale, is mid-range although considerable variation exists between items.

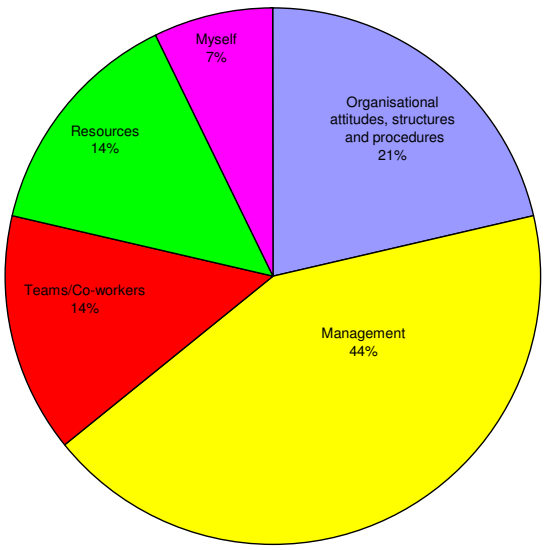
Figure 4-31 Company 8 Comparison to KEYS Norms



Less positive items include strict control by upper management, emphasis on doing things in the same way, protecting territory, excessively formal procedures and structures and risk avoidance by top management. Little variation between items was evident for *Work Group Support, Challenging Work, Supervisory Encouragement, (Lack of) Workload Pressure, Sufficient Resource, Creativity and Productivity.*

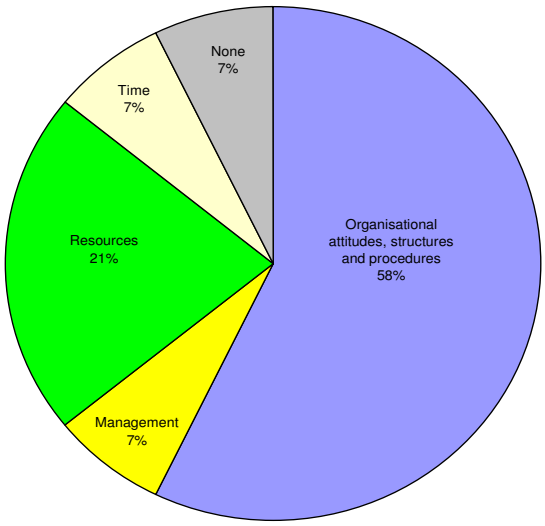
KEYS Section II: Checklist Items

Figure 4-32 Company 8: Most important factor supporting creativity and innovation?



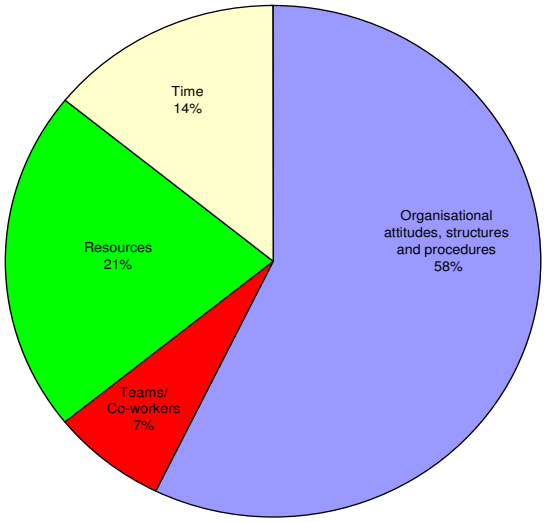
Organisational attitudes, structures and procedures	%	Management	%
Encouragement/support from other groups	7	Encouragement/support from upper management	7
Communication and collaboration around ideas	7	Encouragement/support from supervisor	21
Good communication and *openness* to new ideas	7	Clear vision from upper management	14
Teams or Co-workers	%	*Sufficient Resources*	%
Personal characteristics	7	Money	7
Blend of skills	7	Training and development	7
		Myself	%
		My abilities	7

Figure 4-33 Company 8: Most important factor inhibiting creativity and innovation?



Organisational attitudes, structures and procedures	%	Management	%
Lack of mechanisms for implementing ideas	21	Lack of clear vision	7
Lack of communication and collaboration	7	*Sufficient Resources*	&
Rigid processes and procedures	7	Insufficient people	14
Apathy	7	Insufficient money	7
Lack of job security	7	Time or Workload	%
Avoidance of risk	7	Too much work	7

Figure 4-34 Company 8: Most important suggestion for improving the climate?



Organisational attitudes, structures and procedures	%	Teams or Co-workers	%
Better mechanisms for developing ideas	14	Better communication/*openness*	
Better mechanisms for implementing ideas	7	*Sufficient Resources*	%
Trust	7	More people	14
Clearer definition of roles and responsibilities	7	More money	7
More encouragement/support from other groups	7	Time or Workload	%
More recognition for creative work	7	More time	7
More reward for creative work	7	Less work	7

Relationships between factors

In this organisation, there were no statistically significant correlations for any climate or personality factors with outcome and criterion measures, which is highly unusual compared to other companies in this investigation. Correlations of the criterion scales with all other KEYS scales, shown in Table 24, supports only *Challenging Work* in contributing to *Creativity.* Participants' perceptions of *Challenging Work* were very low and enhancing the work environment on this factor has potential to improve creativity. None of the other scales is even moderately associated with either the *Creativity* or *Productivity* criterion, again, a relatively rare finding compared to others in this investigation.

Table 24 Company 8: Intercorrelations of KEYS Scales

KEYS scale	Criterion ***Creativity***
Challenging Work	.618*
***Correlation is significant at the .05 level (2-tailed)**	

A possible interpretation of this is the organisation of work around a central head office and 15 homes that raises questions regarding the feasibility of a homogeneous organisational climate across such an organisation that is shared between the residential homes and the management team at Head Office. A lack of shared meaning also seems to exist regarding what it means to be creative and innovative in this environment, or even whether creativity is *required*, let alone *how* staff might be encouraged to be more creative in their work. For example, while creativity is seen as desirable by the Central Management is this extended to Managers and Supervisors in the care homes? If so, what exactly does this mean to them? Are they aware of how they might be more creative and innovative in their work? Analysis suggests very positive perceptions of management vision and shared values. However, organisational attitudes, structures and procedures are less supportive in stimulating creativity.

An organisational climate supportive of creativity is a result of multiplicative interactions and this analysis has highlighted a number of areas where perceptions are less positive and where there is potential for improvement. While factors such as *Sufficient Resources* are not easily resolved in a charitable organisation, most of the participants' suggestions for those factors inhibiting creativity and innovation fell into the category of *Organisational attitudes, structures and procedures*, where there is potential to enhance creativity.

To summarise, Management, Head Office staff and some Home Managers are clearly extremely passionate about creativity in their work, particularly in developing innovative care solutions and initiatives are in place to develop Home Managers and supervisors. Yet evidence suggests not all managers and supervisors share the same understanding and passion for creative practice and the organisation of homes means a homogeneous climate is unlikely. However, this company is in the process of transition and it will take time to change the culture and climate, and for shared meaning to cascade hierarchical levels to other care home workers.

4.3 Multiple Case Study Analysis

Previous sections reported on in-depth quantitative and qualitative analysis of independent company cases each of which provide a contribution analogous to a single study and represent a significant contribution to knowledge and theory building. Added value is to be gained by combining data across all companies to address the aims and objectives of this research. Through an in-depth investigation of the major components of the interactionist models, the aim is ultimately to develop a model of theoretical and practical significance to the enhancement of creativity within business organisations.

4.3.1 Individual and Group idea generation and implementation

Table 25 Bivariate Correlations Between Measures and Outcomes

KEYS Scales	Outcome Measures					
	Individual		Group		KEYS Criterion	
	Ideas	Impl.	Ideas	Impl.	*Creativity*	*Productivity*
Organisational Encouragement					.496**	.568**
Supervisory Encouragement					.284**	.453**
Work Group Support					.500**	.494**
Freedom					.234**	.286**
Challenging Work	.235**	.256**	.291**	.311**	.576**	.445**
Sufficient Resources						.431**
Organisational Impediments					-.207**	-.360**
Workload Pressure	.348**	.327**	.353**	.327**		
Creativity	.313**	.315**	.369**	.370**		.301**
Productivity					.301**	
NEO-FFI Openness to experience	.302**	.287**	.366**	.334**	.252**	
Conscientiousness						.181**
Extraversion	.238**	.281**	.218**	.264**	.167**	
Agreeableness					.227**	.210**
Emotional stability		.197**			.215**	

* sig. p<.05; ** sig. p<.01

The first stage in this process was to explore correlations for the entire data set across the eight participating companies (n = 209). Table 25 illustrates statistically significant correlations between all outcome measures of ideas generated and implemented at the level of the individual and the group, the KEYS assessment of creative climate scales

(including *Creativity* and *Productivity* criterion) and the NEO-FFI personality dimensions. In this way, this investigation employs two sets of outcome measures.

For the outcome measures of individual and group ideas generated and implemented, statistically significant correlations are suggested for all four outcomes with three of the KEYS climate scales: *Challenging Work* (KEYS Tier 1), *Workload Pressure* (KEYS Tier 3) and *Creativity*; and two NEO-FFI personality dimensions *Openness to experience* and *Extraversion*.

Due to considerable variation in reported outcome measures, each was banded by percentiles resulting in five groups. One-way ANOVAs were used to test variation between companies on all personality dimensions and KEYS scales for individual and group idea generation and implementation. Results are reported in Tables 26 and 27. Statistically significant variance between companies on these four outcomes measures in relation to the dimensions of *Openness to experience*, *Extraversion*, *Challenging Work* and *Workload Pressure* and the *Creativity* criterion supports the above correlations.

Table 26 Individual Outcomes: One-way ANOVAs

Individual / Factors	Idea generation d.f. 4,170		Implementation d.f. 4, 169	
	F	Sig.	F	Sig.
Openness to experience	3.799	.006	3.810	.005
Extraversion	2.772	.029	3.792	.006
Challenging Work	3.332	.012	3.748	.006
Workload Pressure	7.798	.001	5.771	.001
Creativity criterion	5.304	.001	5.129	.001

Table 27 Group Outcomes: One-way ANOVAs

Group / Factors	Idea generation d.f. 4,168		Implementation d.f. 4, 164	
	F	Sig.	F	Sig.
Openness to experience	7.432	.001	5.402	.001
Extraversion	3.264	.013	4.264	.003
Challenging Work	5.279	.001	5.059	.001
Workload Pressure	6.693	.001	4.462	.002
Creativity criterion	8.049	.001	8.467	.001

Post hoc tests

Post hoc tests were conducted to establish the precise nature of variance between bands for each of the outcome measures on KEYS scales and NEO-FFI personality dimensions. Bonferroni correction makes pair wise comparisons controlling for Type 1 errors although erring on the side of caution increasing the chance that genuine differences in the data might be missed. (Field 2005:340). Broadly, variance was demonstrated between the very high and very low extremes of the bands of all four outcomes for all three KEYS scales and both personality dimensions. In respect of *Workload Pressure* and the *Creativity* criterion variance was additionally demonstrated across most bands for all outcomes.

4.3.2 Comparison of companies on KEYS scales and NEO-FFI

Table 28 One-Way ANOVAs: KEYS scales and NEO-FFI dimensions

KEYS Scales *d.f. **between groups 7, within groups 200, total 207***	Mean		s.d.		F	Sig.
	Sample	KEYS	Sample	KEYS		
Organisational Encouragement	2.81	2.62	0.55	0.23	13.144	.001
Supervisory Encouragement	3.03	3.02	0.50	0.17	5.454	.001
Work Group Support	3.17	3.12	0.50	0.17	2.022	.054
Freedom	2.99	2.94	0.52	0.18	1.099	.365
Challenging Work	2.84	2.99	0.51	0.22	3.498	.001
Sufficient Resources	2.94	2.92	0.49	0.22	3.942	.001
(Lack of) Organisational Impediments	2.99	2.79	0.45	0.24	4.257	.001
Workload Pressure	2.52	2.42	0.51	0.18	4.195	.001
Creativity	2.65	2.70	0.60	0.22	3.523	.001
Productivity	3.02	2.94	0.46	0.24	3.297	.002
NEO_FFI *d.f. between groups 7, within groups 195, Total 202*						
NEO_*Openness to experience*					3.686	.001
NEO_*Conscientiousness*					2.453	.020
NEO_*Extraversion*					2.423	.021
NEO_Agreeableness					1.402	.207
NEO_*Emotional stability*					1.172	.320

RQ1 is concerned with associations between the independent outcome measures of individual and group idea generation and implementation with supportive climate and appropriate personality characteristics. Correlations, ANOVAs and post hoc tests are all highly supportive of the associations of the environmental pressure climate scales, *Challenging Work* (a KEYS stimulant scale) and (Lack of) *Workload Pressure* (an obstacle scale) with individual and group idea generation and implementation at the level of $p<.01$. In addition the NEO-FFI personality

dimensions of *Openness to experience* and *Extraversion* are both suggested as highly supportive of these outcomes at significance levels of $p<.01$ and $p<.05$ respectively. This question also concerns whether it is necessary to differentiate between supporting factors. No differences were apparent either between the individual and group outcomes or between idea generation and implementation.

Having explored relationships between both sets of outcome measures for individual participants (n=209) across all companies, the next stage was to explore variation between companies on all KEYS scales and personality dimensions of the NEO-FFI. One-way ANOVAs suggest for most KEYS scales variation between the companies in this investigation were highly significant at a level of $p<.01$, the only exception being *Freedom*.

In respect of the NEO-FFI personality dimensions, only *Agreeableness* and *Emotional stability* failed to reach statistical significance, indicating little variance between companies on these dimensions. This supports Barrick and Mount (1991) who suggest that *Emotional stability* is important to most jobs and that traits associated with *Agreeableness* are particularly important in positions where social interactions are crucial and which, of course, might also relate to the lack of variance between companies on *Work Group Support*.

Post hoc tests

Post hoc tests were conducted to establish the precise nature of variance between companies for each of the outcome measures on KEYS scales and NEO-FFI personality dimensions.

Bonferroni correction makes pair wise comparisons controlling for Type 1 errors. Statistically significant differences resulting from these tests are summarised in Table 29, which predominantly confirms variance between companies positioned at or towards the very high and very low extremes

on most scales, with the notable exception of *Freedom* where variance between companies failed to achieve statistical significance.

Table 29 Bonferroni post hoc tests

KEYS Scales / Range		Very Low	Low	Mid-Range	Sig. (Bonferroni)
Organisational Encouragement					
Very High	Co 1	5**	3**	8*	*.02 **.001
(6,7 ns)	Co 2	5	3		.001
	Co 4	5	3		.001
Supervisory Encouragement					
Very High	Co 1	3			.001
(7 ns)	Co 8	3**	5*		*.02 **.001
High	Co 6	3			.02
Mid-range	Co 2	3			.002
	Co 4	3			.03
Work Group Support					
Very High	Co 4	3			.05
Challenging Work					
High	Co 1	3**, 8*			**.005 *.011
Sufficient Resources					
Very High	Co 1		3***	2*, 5**	***.001 **.002 *.02
(Lack of) Organisational Impediments					
Very High	Co 1			3	.001
(5,6,8 ns)	Co 4			3	.038
	Co 7			3	.039
High	Co 2			3	.044
(Lack of) *Workload Pressure*					
Very High	Co 3	6			.014
(1,2,5,7 ns)	Co 4	6			.001
	Co 8	6			.001
***Creativity* criterion**					
Very High	Co 4	3***	5**	2*	*.03, **.011, ***.001
***Productivity* criterion**					
Very High	Co 1			3, 5	.02

4.3.3 General Linear Models

The overall aim of this investigation was to develop a model of practical and theoretical significance based on the contribution of social and psychological factors including creative climate, personality and the meaning of creativity in context to organisational members. In identifying factors for inclusion in any resulting model the ideal would be independent variables that are highly correlated with the dependent variable but with little intercorrelation between them (Hair, Black et al. 2006). However, in the complex context of business organisations and given the nature of the KEYS inventory it is to be expected that the concepts measured are related to some extent and the environment scales generally intercorrelate at moderate levels, indicating elements of commonality and distinctiveness in the work environment dimensions (Amabile, Coon et al. 1996:1167).

Table 30 Regression on KEYS Scales (DV *Creativity*)

Independent Variables	B	Std. Error	Beta	t	Sig.	Collinearity Statistics	
						Tolerance	VIF
Constant	-.707	.536		-1.318	.189		
Organisational Encouragement	.333	.095	.308	3.515	.001	.376	2.660
Supervisory Encouragement	.087	.083	.073	1.048	.296	.591	1.693
Work Group Support	.278	.087	.233	3.185	.002	.539	1.856
Freedom	.110	.073	.095	1.514	.132	.724	1.382
Challenging Work	.372	.083	.315	4.463	.001	.576	1.735
Sufficient Resources	-.187	.089	-.153	-2.108	.036	.547	1.828
Organisational Impediments	.316	.101	.237	3.119	.002	.498	2.009
Workload Pressure	-.079	.077	-.067	-1.028	.305	.687	1.455
Productivity	-.099	.092	-.077	-1.079	.282	.568	1.759

In this investigation moderate bivariate correlations between different scales of the KEYS climate survey were suggested in Table 25. However, if independent variables are too highly correlated their contribution might be masked or inflated, distorting any resulting model of organisational creativity. Therefore, multiple regression analysis of relationships between KEYS scales assessed the degree of multicollinearity, as shown in Tables 30 and 31. On the basis that a correlation of 1 indicates perfect collinearity, tolerance represents the amount of variability not explained by the other independent variables ($1-R^2$) and, therefore, a high tolerance value and, its inverse, a low variance inflation factor (VIF) are desirable indicators of low multicollinearity in the estimation process (Hair, Black et al. 2006). Tolerance values of less than .3 are generally considered low indicating problematic degrees of multicollinearity.

In this investigation multicollinearity is not a problem as all tolerance values exceed this level and, with one or two exceptions, indicate moderate to high degrees of tolerance for the independent variables that are well within acceptable limits. In respect of the NEO-FFI personality dimensions low bivariate correlations with KEYS dimensions suggest multicollinearity is unlikely. Multiple regression on both *Creativity* and *Productivity* criterion measures confirm tolerance levels for all personality dimensions of .7 or above.

Table 31 Regression on KEYS Scales (DV *Productivity)*

Independent variables	B	Std. Error	Beta	t	Sig.	Collinearity Statistics	
						Tolerance	VIF
Constant	.307	.415		.739	.461		
Organisational Encouragement	.278	.075	.332	3.698	.001	.354	2.825
Supervisory Encouragement	.064	.064	.070	1.003	.317	.587	1.702
Work Group Support	.186	.069	.201	2.697	.008	.513	1.951
Freedom	.072	.056	.081	1.282	.201	.715	1.398
Challenging Work	.127	.067	.138	1.876	.062	.524	1.909
Sufficient Resources	.167	.069	.176	2.408	.017	.535	1.869
Organisational Impediments	.106	.080	.103	1.332	.184	.474	2.108
Workload Pressure	.010	.059	.011	.176	.861	.684	1.463
Creativity	-.059	.055	-.076	-1.079	.282	.573	1.746

Extending estimation procedures to the development of a model that is of practical and theoretical significance it is necessary to evaluate the power of the tests in providing the most informed perspective on the results obtained. Advantages of the general linear model (GLM) approach in providing a single estimation model within which any number of differing statistical models can be accommodated are in its flexibility and simplicity in model design (Hair, Black et al. 2006).

For the investigation in hand the first stage in this process necessitates the estimation of a model based on the complexities of the two main measures, comprising the KEYS assessment of creative climate and the NEO-FFI personality dimensions. Based on the *Creativity* criterion as the dependent variable all KEYS scales and NEO-FFI dimensions were entered into a univariate general linear model (GLM) and through a process of refinement and elimination based on the significance of contributions to the *Creativity* criterion, details of the optimal model are shown in Table 32. This suggests that in the companies participating in this investigation three stimulant scales, one obstacle scale and one personality dimension contribute almost 47 percent variance to the creative climate.

This is supportive of Amabile's model (Amabile, Taylor et al. 1995) where *Organisational Encouragement*, *Work Group Support* and *Challenging*

Work represent the Tier 1 scales that are suggested as the strongest differentiators between high and low creative environments in respect of which significant relationships should exist with the *Creativity* criterion in a creative environment. In this investigation, *Challenging Work* is the strongest of these stimulants for creativity. Table 32 also highlights the contribution of (Lack of) *Organisational Impediments*, a Tier 2 obstacle scale and the *Openness to experience* dimension of personality. Model 1 confirms the interaction between climate factors and personality characteristics in supporting organisational creativity, as addressed by RQ3.

Table 32 Model 1: Univariate GLM for *Creativity*

Source	d.f.	F	Sig.	Partial Eta Squared	Observed Power(a)
Corrected Model	12	15.727	.001	.500	1.000
Intercept	1	7.287	.008	.037	.766
Organisational Encouragement	1	7.493	.007	.038	.777
Work Group Support	1	6.836	.010	.035	.739
Challenging Work	1	29.099	.001	.133	1.000
Organisational Impediments	1	8.291	.004	.042	.817
NEO_O	1	7.328	.007	.037	.768
Company	7	4.386	.001	.140	.991

R^2 = .500 (Adjusted R^2 = .468)

However, it is important to recognise that the KEYS assessment of creative climate includes *two* outcome criterion scales, *Creativity* and *Productivity*. While the focus of the investigation in hand is *Creativity*, it is interesting to note in Table 25, significant correlations of some scales with the *Productivity* criterion in addition to or rather than with the *Creativity* criterion.

Table 33 Univariate GLM for *Productivity (Alternative model)*

Source	d.f.	F	Sig.	Partial Eta Squared	Observed Power(a)
Corrected Model	10	16.207	.001	.451	1.000
Intercept	1	24.474	.001	.111	.998
Organisational Encouragement	1	20.123	.001	.093	.994
Work Group Support	1	10.733	.001	.052	.903
Challenging Work	1	3.754	.054	.019	.487
Sufficient Resources	1	6.145	.014	.030	.694
Company	7	2.115	.044	.070	.798

R^2 = .462 (Adjusted R^2 = .431)

Therefore, it is important to investigate the contribution of KEYS scales and personality dimensions based on the NEO-FFI to *Productivity*. Using the same process as for the *Creativity* criterion based on the *Productivity* criterion as the dependent variable all KEYS scales and NEO-FFI dimensions were entered into a univariate GLM and through a process of refinement and elimination based on the significance of contributions to the *Productivity* criterion, details of the optimal model are shown in Table 33. Again, this demonstrates the contribution of the three Tier 1 stimulant scales and highlights their similarity and distinctiveness between the two criterion scales. In this case, the contribution of *Challenging Work* is far weaker than for *Creativity* and it is *Sufficient Resources* rather than *Organisational Impediments* that contributes to variance. No personality dimensions contribute significantly to *Productivity*.

As a further test of these models based on both dependent variables all measures were entered into a multivariate GLM, the results of which are shown in Table 34, which is supportive of the above models.

Table 34 Multivariate GLM

Source	DV	d.f.	F	Sig.	Partial Eta Squared	Observed Power
Corrected Model	C	13	14.643	.001	.503	1.000
	P	13	13.691	.001	.486	1.000
Intercept	C	1	3.307	.071	.017	.440
	P	1	4.528	.035	.024	.562
Organisational Encouragement	**C**	**1**	**8.363**	**.004**	**.043**	**.820**
	P	*1*	*11.559*	*.001*	*.058*	*.923*
Work Group Support	**C**	**1**	**7.934**	**.005**	**.040**	**.800**
	P	*1*	*7.906*	*.005*	*.040*	*.799*
Challenging Work	**C**	**1**	**27.575**	**.001**	**.128**	**.999**
	P	*1*	*4.919*	*.028*	*.025*	*.597*
Sufficient Resources	C	1	1.314	.253	.007	.207
	P	*1*	*7.536*	*.007*	*.039*	*.780*
(Lack of) Organisational Impediments	**C**	**1**	**6.599**	**.011**	**.034**	**.724**
	P	1	.497	.482	.003	.108
NEO-FFI *Openness to experience*	**C**	**1**	**6.034**	**.015**	**.031**	**.686**
	P	1	2.770	.098	.015	.381
Company	**C**	**7**	**4.322**	**.001**	**.139**	**.990**
	P	*7*	*1.989*	*.059*	*.069*	*.767*

Creativity: R^2 = .503 (Adjusted R^2 = .469)
Productivity: R^2 = .486 (Adjusted R^2 = .451)

While post hoc tests demonstrated a lack of statistically significant variance between companies in respect of the NEO-FFI personality dimensions, *Openness to experience* clearly contributes to the general linear model for *Creativity*. The significance of this dimension and of *Extraversion*, have been demonstrated through correlation (Table 25) and analysis of variance (Table 28). As Bonferroni errs on the side of caution increasing the chance that genuine differences in the data might be missed (Field 2005:340) further analysis is warranted. *Openness to experience* represents the dimension deemed associated with creativity and initial analysis focussed on this dimension, commencing with a crude scanning of the raw data that highlights extreme participant reporting as illustrated in Table 35. Considerable variation in outcome measures was apparent and preliminary scanning of the data set generally seemed to support relationships between outcome measures and the *Openness to experience* dimension of the Five Factor Model of personality.

Table 35 Analysis of outcome measures and *Openness*

Case	Co	Ind_Ideas	Ind_impl	Group_ideas	Group_Impl	NEO-O
16	1	50	15	100	30	4.17
31	2	100	5	150	7	3.58
37	2	50	40	50	40	2.58
43	2	70	35	40	5	4.00
54	2	2000	900	900	400	4.67
55	2	100	25	100	25	3.67
58	2	100	15	250	20	3.80
64	2	50	25	50	25	3.58
70	2	100	50	100	50	3.42
72	2	2000	200	1000	500	4.58
74	2	100	100	100	100	3.00
88	2	300	150	100	50	3.25
91	2	300	120	150	80	3.50
93	3	50	25	100	50	4.50
115	3	200	120	400	250	3.92
135	4	1000	5	0	0	3.58
174	6	50	50	20	20	4.17
183	6	50	10	5	3	3.33
186	6	52	40	52	40	3.58
188	6	5000	100	100	10	4.25
189	7	100	50	10	8	3.42

Banding of the *Openness* dimension based on quartile ranges (1 <=3; 2<=3.3; 3<=3.67; 4 >3.67) was employed to explore individual and group idea generation and implementation outcome measures (Table 36) and to summarise the variation in these outcome measures. Standard deviations clearly demonstrate huge variability. However, this analysis suggests that

means for all outcomes increase with increased *Openness to experience* and participants' perceptions of a creative work environment.

Table 36 Outcome measures *Openness to experience banding*

NEO-O / Outcome	Band 1		Band 2		Band 3		Band 4	
	Mean	s.d.	Mean	s.d.	Mean	s.d.	Mean	s.d.
Ind_ideas	10.48	18.58	21.15	51.86	45.52	152.35	232.86	855.56
Ind_impl	6.54	16.52	10.00	25.79	10.27	20.66	60.40	202.13
Group_ideas	13.06	26.59	15.08	22.97	23.49	37.22	94.72	215.47
Group_impl	7.14	16.268	6.30	9.33	10.93	16.18	37.95	100.14
Creativity	2.47	.55	2.61	.62	2.68	.59	2.85	.56
Productivity	3.01	.46	3.01	.47	3.02	.44	3.03	.52

Banding of individual and group idea generation and implementation allows exploration of outcomes based on *Openness to experience* and *Extraversion* bands. The box plots presented in Figure 4-28 clearly illustrate that medians and quartile ranges for *Openness* Band 4 (very high) are consistently higher than for other *Openness* bands across all outcomes. The median for all outcomes is 4 and the mode 5 with the exception of group implementation that is bi-modal with 4. More simply, on average those higher on *Openness to experience* generate and implement greater numbers of ideas individually and in groups than those lower on this dimension. Interestingly, little difference is apparent in outcome bands between *Openness* bands 2 and 3, greater differences being apparent at the extremes, for those very low (Band 1) or very high (Band 4) on this dimension. In respect of the *Extraversion* dimension of personality the picture appears more complex. However, it is reasonable to suggest that on average those higher on *Extraversion* tend to implement more ideas on an individual and group basis and contribute to a greater number of group ideas. No differences are apparent on individual idea generation.

Figure 4-28 NEO-*Openness to experience* and *Extraversion* Box Plots

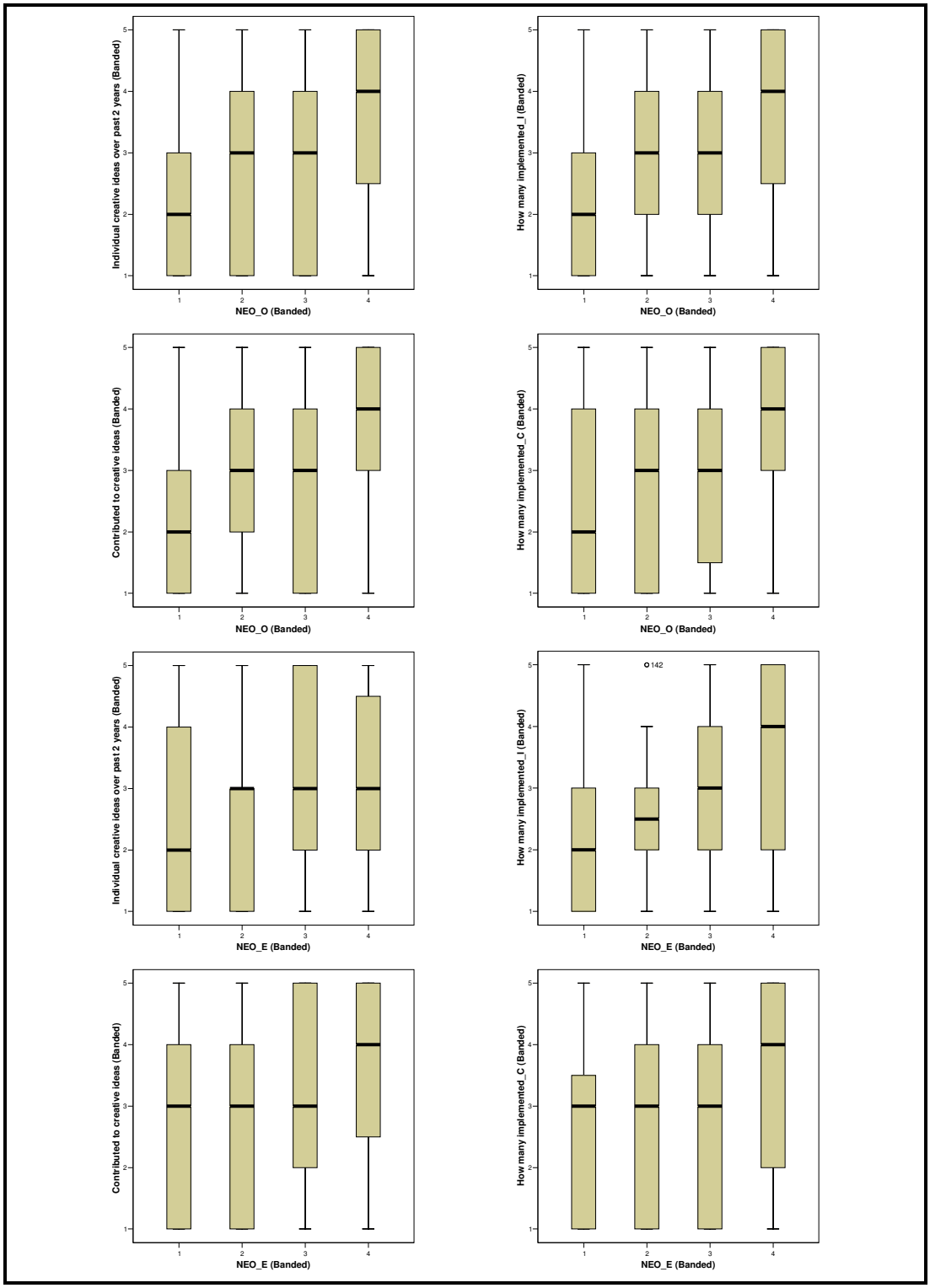


Table 37 Participants by *Openness to experience* banding

Company	NEO_FFI *Openness to experience* Bands %				N
	1	2	3	4	
1	24	14	34	28	29
2	23	23	29	25	60
3	30	37	13	20	30
4	15	36	19	30	27
5	48	24	19	9	21
6	20	13	27	40	15
7	83	0	17	0	6
8	40	40	13	7	15
Total	58 (29%)	52 (26%)	47(23%)	46 (22%)	203

To further explore the *Openness* dimension it is necessary to explore numbers of participants in each band by company (Table 37) and to explore general linear models based on these bands. Estimation models for perceptions of creative organisational climate suggest the contribution of different factors based on Openness to experience bands. In respect of bands 1 and 2 (low Openness) the stimulant scales Challenging Work and Organisational Encouragement, both Tier 1 stimulant scales, together contribute almost 30 percent variance in Creativity (Table 38).

Table 38 Model 2: Univariate GLM on *Creativity (low Openness)*

Source	d.f.	F	Sig.	Partial Eta Squared	Observed Power
Corrected Model	2	23.362	.001	.304	1.000
Intercept	1	2.774	.099	.025	.379
Organisational Encouragement	1	11.448	.001	.097	.918
Challenging Work	1	10.830	.001	.092	.903

R^2 = .304 (Adjusted R^2 = .291)

From Table 37 high proportions of participants in companies 3, 5, 7 and 8 fall into bands 1 and 2 on *Openness*. Observing the positioning of these companies on these scales relative to KEYS norms (Table 47) for *Challenging Work* all four companies fall into the low or very low ranges and in all but one a significant bivariate correlation is suggested. For companies 7 and 8, *Organisational Encouragement* corresponds with the *Creativity* criterion in falling into the mid-range. Similarly, for companies 3 and 5, where *Organisational Encouragement* and *Creativity* are correspondingly low. Again, in most cases a significant correlation with the *Creativity* criterion exists. For all four companies with a high proportion of respondents low on *Openness, Creativity* is mid-range to low. This might

be supportive of the suggestion that those low on *Openness to experience* are likely to benefit from greater *Organisational Encouragement* and more *Challenging Work*. Estimation models for participants in the high and very high bands on the personality dimension of *Openness to experience* appear more complex. Companies 1, 2 and 6 demonstrate high proportions of participants in Band 3, and in companies 4 and 5 the proportions almost reach 20 percent. In companies 1, 2 and 4 *Organisational Encouragement* is very high and *Creativity* is mid-range or high respectively. Company 6 is that is mid-range and company 5 that is very low on *Organisational Encouragement* are both low on *Creativity*. However, correlations with *Creativity* are less clear. *Supervisory Encouragement* that lacks significance to this point, is mid-range or higher in all but one company (5) but is correlated significantly only in two cases. *Challenging Work* is less clear in the positioning relative to KEYS norms, but significantly correlates with the *Creativity* criterion in all companies. Lack of *Organisational Impediments* is mid-range or higher for all five companies.

A single parsimonious model for band 3 has not been realised. An alternative and less robust model suggests that *Challenging Work* alone contributes almost 38 percent to the *Creativity* criterion. However, the interaction is clearly more complex, the resulting model contributing almost 44 percent variance based on three stimulants and one obstacle scale (Table 39). For Band 3 there is evidence for the contribution of *Organisational Encouragement* and *Challenging Work* as suggested by Bands 1 and 3 but clearly this model is more complex.

Table 39 Model 3: Univariate GLM on *Creativity (high Openness)*

Source	d.f.	F	Sig.	Partial Eta Squared	Observed Power
Corrected Model	4	9.683	.001	.486	.999
Intercept	1	3.163	.083	.072	.412
Challenging Work	1	10.267	.003	.200	.879
Organisational Encouragement	1	2.956	.093	.067	.390
Supervisory Encouragement	1	3.299	.077	.074	.426
Organisational Impediments	1	4.605	.038	.101	.554

R^2 = .486 (Adjusted R^2 = .436)

For those participants very high on *Openness (Band 4)* a much more robust model emerges that explains a substantial 60percent of variance (Table 40) based on two Tier 1 stimulant scales: *Challenging Work* contributing 19 percent and *Work Group Support* 41 percent. Companies 1, 2, 4 and 6 demonstrate a high proportion of participants in this band. Companies 1 and 2 are mid-range on *Creativity*, Company 6 is low and Company 4 is very high. While *Challenging Work* is high only in one company, in all cases *Work Group Support* is high or very high. In all significant correlations are demonstrated for both scales with *Creativity*. Again, while not causal, these two stimulant scales appear to make an important contribution to *Creativity* for those high on the personality dimension of *Openness.* This model suggests that these scales are of greater importance than *Organisational Encouragement* for such individuals. Model 4 suggests *Challenging Work* and *Work Group Support* are more supportive of Creativity to individuals high on Openness than Management or Organisational factors.

Table 40 Model 4**:** Univariate GLM on *Creativity (very high Openness)*

Source	d.f.	F	Sig.	Partial Eta Squared	Observed Power
Corrected Model	2	34.367	.001	.615	1.000
Intercept	1	.261	.612	.006	.079
Challenging Work	1	10.154	.003	.191	.876
Work Group Support	1	29.594	.001	.408	1.000

R^2 = .615 (Adjusted R^2 = .597)

While inconclusive and based on the premise that Bonferroni is overly cautious the above analysis is important in highlighting the personality dimension of Openness as moderating this significance of supportive factors.

4.3.4 Analysis of additional variance by company

The value of this investigation lies not only in the systemic approach to interactionist models of creativity based on creative climate and personality dimensions on which the above quantitative analysis is based. Additional data arising from each of the case studies is analysed in an

attempt to account for the remaining 53 percent variance. This introduces further analysis and discussion around KEYS as appropriate where this adds value beyond the quantitative analysis. For example, company means might mask variability between departments and scale means might mask variability between items that illuminate significant factors of relevance to the analysis. The investigation now progresses to analyse additional variance beyond the contribution of organisational climate as measured by KEYS and personality dimensions, as measured by the NEOFFI. It is at this stage that the investigation begins to consider the final broad research question of how might the relative contributions of psychological, social and organisational factors be moderated by shared meaning and values of the organisational context. The benefits here are comparison across multiple in-depth case studies.

Firstly, section two of the KEYS assessment of climate for creativity requires respondents to indicate one factor from a choice of approximately fifty across nine categories for each of three questions on supporting, inhibiting and improving creativity in their company. Response frequencies for each of these three questions by category for each company is summarised in Tables 41-43.

Table 41 Most important factor supporting creativity and innovation?

Co.	Creativity criterion	Organisational Attitudes, Structures, Procedures	Manage-ment	Teams/ Co-workers	Work or Project	*Sufficient Resources*	Myself	None
4	**Very High**	**40%**	**12%**	**16%**	**16%**	**4%**	**0**	**0**
1	*Mid-range*	***32%***	***56%***	*4%*	*0*	*0*	*0*	*0*
2	*Mid-range*	***29%***	***18%***	*23%*	*0*	*9%*	*0*	*0*
7	*Mid-range*	***50%***	***0***	*33%*	*0*	*0*	*0*	*0*
8	*Mid-range*	***21%***	***44%***	*14%*	*0*	*14%*	*7%*	*0*
6	Low	21%	22%	43%	7%	0	7%	0
5	Low	10%	10%	35%	20%	0	10%	15%
3	Very Low	14%	11%	17%	18%	7%	11%	11%

Table 42 Most important factor inhibiting creativity and innovation?

Co.	*Creativity* criterion	Organisational Attitudes, Structures, Procedures	Manage-ment	Teams/ Co-workers	Work or Project	*Sufficient Resources*	Time/ Work-load	None
4	Very High	28%	12%	16%	4%	4%	20%	12%
1	Mid-range	19%	6%	0	3%	7%	48%	14%
2	Mid-range	19%	5%	0	4%	14%	29%	14%
7	Mid-range	0	17%	0	0	17%	66%	0
8	**Mid-range**	**58%**	**7%**	0	0	21%	7%	7%
6	**Low**	**14%**	**0**	7%	7%	14%	51%	0
5	**Low**	**30%**	**20%**	0	20%	15%	5%	10%
3	**Very Low**	**42%**	**11%**	11%	11%	7%	11%	7%

Table 43 Most important suggestion for improving the climate for creativity?

Co.	*Creativity* criterion	Organisational Attitudes, Structures, Procedures	Manage-ment	Teams/ Co-workers	Work or Project	Sufficient Resources	Time/ Work-load	None
4	Very High	24%	13%	17%	13%	21%	4%	4%
1	Mid-range	30%	4%	7%	0	7%	38%	0
2	Mid-range	35%	7%	10%	0	19%	19%	5%
7	Mid-range	17%	0	17%	0	33%	33%	0
8	**Mid-range**	**58%**	**0**	7%	0	21%	14%	0
6	**Low**	**28%**	**22%**	7%	14%	0	22%	7%
5	**Low**	**20%**	**20%**	0	10%	15%	15%	15%
3	**Very Low**	**35%**	**18%**	4%	7%	18%	4%	7%

Emerging through analysis for each of the companies during the course of data collection over the duration of this study was that clear support or inhibition of a factor or group of factors in respect of the second question, mirrors the positioning of the company relative to KEYS norms for *Creativity*. For example, where large proportions of respondents report factors in the *Organisational attitudes, structures and procedures* and *Management* categories this is likely to indicate a supportive climate, as for companies 1,2,4,7 and 8. For companies where support for creativity is low responses are less clearly defined. This is reinforced through the pie charts used to illustrate responses for each company. Pie charts for low creative climate companies resemble the spokes of a bicycle wheel. However, this is less clear in companies 2, 7 and 6. Both companies 2 and 6 are involved in communications and closely allied to advertising and marketing, more traditionally 'creative industries'. This is likely to be a reflection of respondents' perceptions relative to the reference group, which is perceived as highly creative. This might also apply to company 4 who are in research and development.

For those factors perceived as inhibiting creativity and innovation the position is almost the inverse of the previous question. Here, those companies where the climate is less supportive higher proportions of responses are indicated for *Organisational attitudes, structures and procedures* and *Management* categories. For those companies that are more supportive of creativity fewer respondents indicate these as inhibitory. Company 6 perhaps represents an exception again for the reasons already discussed. *Workload Pressure* features quite highly here for many companies although interestingly less so for those companies where *Organisational attitudes, structures and procedures* are supportive of creativity and innovation. However, these are not reinforced through suggestions for improving creativity and innovation where *Workload Pressure* takes on somewhat lesser significance. In respect of this question most companies indicated factors that fall into the category. However, factors falling into the *Management* category tended to be reported by companies less supportive of creativity.

Table 44 For creative ideas not implemented what was the reason?

Company	**4**	**2**	**7**	**8**	**5**	**6**	**3**
Creativity criterion	Very High	Mid-range	Mid-range	Mid-range	Low	Low	Very Low
Sample	27	63	6	15	24	15	30
No. Completing	*22*	*46*	*5*	*9*	*13*	*12*	*19*
Not highly valued	50%	26%	20%	11%	8%	17%	5%
Low priority	59%	52%	80%	44%	46%	33%	63%
Cost	45%	65%	0%	33%	62%	75%	58%
Risk	27%	20%	0%	11%	38%	17%	11%
Not radical	9%	9%	0%	0%	0%	17%	0%
Too radical	14%	15%	0%	0%	0%	0%	5%
Political behaviour	14%	7%	0%	0%	0%	0%	5%

Linked to individual and group idea generation and implementation outcomes, in stage 2 participants were requested to indicate possible reasons for non-implementation of ideas. However, other than the reporting of 'not highly valued' by higher proportions there are few differences. Most companies reported low priority or costs more frequently (Table 44).

Also adopted in stage 2 were suggestions of what it means to be creative and innovative in practice. Participants could select all that apply. Selection of fun and novelty or originality was more frequently in supportive climates. Differences are not clear but reported for information.

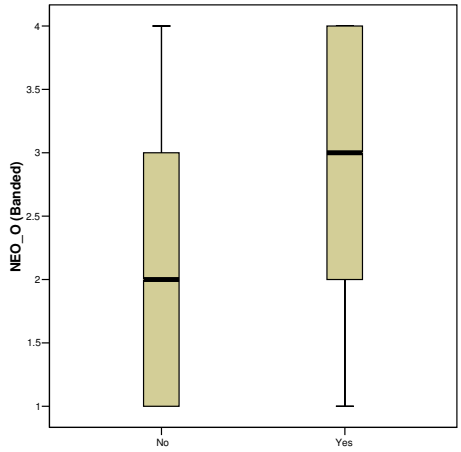
Table 45 Meaning of creativity and innovation in practice?

Company	**4**	**2**	**7**	**8**	**5**	**6**	**3**
Creativity criterion	Very High	Mid-range	Mid-range	Mid-range	Low	Low	Very Low
Sample	27	63	6	15	24	15	30
No. Completing	*1*	*57*	*6*	*15*	*22*	*15*	*29*
Fun	41%	63%	33%	27%	14%	33%	14%
Exceeding expectations	15%	65%	33%	27%	0%	60%	38%
Doing things differently	52%	81%	67%	53%	23%	47%	48%
Challenging preconceived ideas	52%	63%	17%	53%	45%	67%	55%
Fresh perspectives	52%	75%	67%	67%	50%	80%	55%
Novelty/originality	81%	58%	0%	13%	14%	33%	7%
Identifying new opportunities	81%	na	33%	67%	41%	60%	na
Appropriate	19%	42%	17%	47%	36%	20%	28%
Acceptable	15%	37%	17%	33%	27%	13%	21%
Feasible	0%	26%	0%	0%	0%	0%	17%
Incremental	15%	18%	0%	0%	14%	7%	3%
Radical	37%	16%	0%	13%	9%	13%	7%

As a final contribution towards a comparison of participating companies, it is useful to analyse data for supplementary factors. Based on the entire dataset (n=209) highly significant relationships were evident between self-rating, self-perception, hierarchical level and creative problem solving training with all individual and group idea generation and implementation outcome measures as well as with the KEYS Creativity criterion at the level of $p<.01$. Among these factors, training in creative problem solving is that in which organisations are most likely to be able to intervene.

Analysis of the relationship between the *Openness to experience* dimension of personality and creative problem solving training provides evidence of a highly significant correlation ($r=.204$ $p<.01$). Further exploration of the data reveals that participants across all four *Openness* bands may or may not have participated in creative problem solving training.

Figure 4-35 Have you ever participated in creative problem solving training?



However, as shown in Figure 4-35 the median is band 2 for those who have not participated in such training. For those having participated the median is band 3. This suggests that those who have participated in such training on average tend to be higher in *Openness to experience* than those who have not. Of course, from this it is impossible to infer direction. It might be that CPS training increases *Openness to experience* or that CPS is valued in companies that attract those high on *Openness*? An alternative explanation might be that those higher in *Openness* seek out CPS training. Table 46 presents an analysis by company of creative problem solving training.

Table 46 Reports of Creative Problem Solving Training

Company	KEYS Creativity	CPS Training		Total
		No	Yes	
1	Mid-range	8 (28%)	21 (72%)	29
2	Mid-range	37 (63%)	22 (37%)	59
3	Very Low	19 (63%)	11 (37%)	30
4	Very-high	7 (27%)	19 (73%)	26
5	Low	21 (95%)	1 (5%)	22
6	Low	9 (60%)	6 (40%)	15
7	Mid-range	6 (100%)	0	6
8	Mid-range	11 (73%)	4 (27%)	15

Revisiting Model 1, the general linear model for Creativity (Table 32), inclusion of creative problem solving increases the variance explained slightly to .479. However, Levine's test of homogeneity of variance then becomes significant suggesting common variance between *Openness to experience* and creative problem solving training.

4.3.5 Qualitative comparisons of additional variance by company

Table 47 summarises the results of the KEYS creative climate survey and the NEO-FFI of personality for each of the multiple case comparisons in this investigation. This includes results for most KEYS scales, not just those suggested as contributing to the optimal overall model (Model 1), but excludes *Freedom* and *Sufficient Resources* for which little evidence is apparent in this investigation. The pattern intuitively emerging from case comparisons suggests that the strength of the intercorrelations of stimulant and obstacle scales with the criterion scale interact with the relative positioning of each based on KEYS database norms. The significance of the factors in the general linear model for creativity, Model 1(Table 32) is clearly demonstrated for each of the companies, with some exceptions, in accounting for almost 47 percent variance. General linear models possibly account for greater variance for high *Openness* individuals but caution is necessary.

Table 47 orders companies by the range into which they fall for the *Creativity* criterion based on database norms. **Company 4** (very high) is a very close fit to Amabile's componential model based on Tier 1 (*Organisational Encouragement*, *Work Group Support* and Challenge) and Tier 2 (*Supervisory Encouragement*, *Organisational Impediments* and *Freedom*) scales, even though two of the scales compare less favourably, falling into the Low and Mid-ranges. Positioning of *Challenging Work* as low resulted from participants' perceptions following recent restructuring, of which the researcher was made aware. Regardless, it is interesting that participants' perceptions for most scales remain high. Correlations of scales with Creativity confirm the relationships of the Tier 1 scales to this criterion. All are highly statistically significant at the level of $p<.01$, as is the relationship between *Creativity* and *Productivity.* Analysis revealed little variation between scale items confirming a climate that is highly supportive of creativity and one where there are few obstacles. Companies lower down in this table fall into the mid-range or below on *Creativity* and the patterns become more complex than that for Company 4. It is

Table 47 Comparison of companies on KEYS Scales and NEO-FFI

Co.	N	n	KEYS		Raw Mean	s.d.	KEYS		Correlations with criterion scales	
			Mean	s.d.			Norms	Scale	*Creativity* **p<.01 *p<.05	*Productivity* **p<.01 *p<.05
4	33	27	2.62	.23	3.09	.47	VH	*Organisational Encouragement*	.72**	.77**
			3.12	.17	3.32	.57	VH	*Work Group Support*	.73**	.63**
			2.99	.22	2.87	.54	L	*Challenging Work*	.74**	.67**
			3.02	.17	2.96	.48	MR	*Supervisory Encouragement*	.45*	.57**
			2.79	.24	3.07	.43	VH*	*Lack of Organisational Impediments*	ns	- .55**
			2.42	.18	2.77	.64	VH*	*Lack of Workload Pressure*	ns	-.52**
			2.70	.22	3.08	.47	VH	*Creativity*	1	.68**
			2.94	.24	2.92	.52	MR	*Productivity*	.68**	1
					3.48	.41		*NEO-FFI Openness to experience*	ns	ns
1	130	30	2.62	.23	3.07	.50	VH	*Organisational Encouragement*	.58**	ns
			3.12	.17	3.24	.49	H	*Work Group Support*	.56**	.37
			2.99	.22	3.13	.54	H	*Challenging Work*	.60**	ns
			3.02	.17	3.20	.43	VH	*Supervisory Encouragement*	ns	.63**
			2.79	.24	3.24	.31	VH*	*Lack of Organisational Impediments*	ns	-.48**
			2.42	.18	2.44	.39	MR*	*Lack of Workload Pressure*	ns	ns
			2.70	.22	2.74	.67	MR	*Creativity*	1	ns
			2.94	.24	3.24	.32	VH	*Productivity*	ns	1
					3.47	.52		*NEO-FFI Openness to experience*	ns	ns
2	120	63	2.62	.23	2.99	.44	VH	*Organisational Encouragement*	ns	.53**
			3.12	.17	3.21	.47	H	*Work Group Support*	.30*	.53**
			2.99	.22	2.87	.45	L	*Challenging Work*	.49**	.31*
			3.02	.17	3.07	.43	MR	*Supervisory Encouragement*	ns	.28*
			2.79	.24	3.01	.42	H*	*Lack of Organisational Impediments*	ns	-.25*
			2.42	.18	2.47	.47	MR*	*Lack of Workload Pressure*	ns	ns
			2.70	.22	2.64	.53	MR	*Creativity*	1	ns
			2.94	.24	3.13	.39	H	*Productivity*	ns	1
					3.42	.49		*NEO-FFI Openness to experience*	.32*	ns
7	8	6	2.62	.23	2.64	.20	MR	*Organisational Encouragement*	.81*	ns
			3.12	.17	3.23	.48	H	*Work Group Support*	ns	ns
			2.99	.22	2.50	.24	VL	*Challenging Work*	.93**	ns
			3.02	.17	2.96	.35	MR	*Supervisory Encouragement*	ns	.85*
			2.79	.24	3.32	.43	VH*	*Lack of Organisational Impediments*	ns	ns
			2.42	.18	2.7	.33	VH*	*Lack of Workload Pressure*	ns	-.94**
			2.70	.22	2.72	.52	MR	*Creativity*	1	ns
			2.94	.24	2.92	.31	MR	*Productivity*	ns	1
					2.88	.30		*NEO-FFI Openness to experience*	ns	ns

suggested that the contribution of the stimulant scales to *Creativity* is based not only on favourable comparison with KEYS norms but also on

the relative strength of the correlation between each of the scales and the criterion measure as an indication of whether such factors are important in supporting creativity.

For example, in **Company 1**, while the Tier 1 scales (Organisational Encouragement, Work Group Support, Challenging Work) are high and very high, correlations with Creativity are weaker than for Company 4 resulting in the mid-range Creativity. (Lack of) Workload Pressure is also mid-range and, together with lack of shared meaning, as discussed in the case analysis, are likely to have impaired respondents' perceptions of a creative climate. It is interesting that the *Openness* dimension of personality fails to achieve statistical significance in relation to *Creativity.*

However, significant associations were evident with group idea generation, individual and group implementation. Further, 72 percent of respondents were high or very high on *Openness*, which might mask important variation in outcomes.

Looking through the remainder of the companies, intuitively, it seems that the positioning of *Creativity* is a result of the combination of the positioning of stimulant and obstacle scales relative to KEYS norms *and* the strength of the relationship of each with the *Creativity* criterion measure. Further, it is suggested that *Openness to experience* is associated with *Creativity* for companies where the climate is less supportive. For **Company 2** only the bivariate correlations for *Work Group Support* and *Challenging Work* reach statistical significance with *Creativity,* which is mid-range. While (Lack of) *Organisational Impediments* is high, there is no significant relationship with Creativity. The only scale to fall into the very high range is *Organisational Encouragement*, which correlates significantly with the *Productivity* rather than *Creativity*. Indeed, all three Tier 1 stimulant scales, two Tier 2 scales and one Tier 3 all correlate significantly with *Productivity*, which is high. Creativity is essential to the core business and currently formed a strand of strategy. This company is also more demonstrably creative in terms of the culture of the organisation, where initiatives such as dress-down, no e-

mails Fridays feature strongly. However, shared meaning and creative requirement are lacking. Associates have experienced training in creative problem solving, although ad hoc rather than embedded. Lack of integration between departments reflected in huge variation and fragmentation of data. Associates are evenly distributed between the four *Openness bands* and highly significant correlations were suggested for individual and group outcomes and for *Creativity*. The Creativity criterion is, therefore, likely to result from the interaction between the perceived levels of support on each scale, the strength of association with the *Creativity* criterion and particularly the interaction of high *Openness* with *Work Group Support* and *Challenging Work*, the model suggested to explain creativity in those high on the *Openness* dimension.

For Company 7, while several scales are high or very high, only two reach statistical significance, *Organisational Encouragement* that is mid-range and *Challenging Work* that is very low. Multiplicative interaction results in mid-range *Creativity.* *Work Group Support*, (lack of) *Organisational Impediments*, *Sufficient Resources* and (lack of) *Workload Pressure* are all high or very high but are not significantly associated with *Creativity.* With reference to personality, 83 percent of participants in Company 7 are very low on *Openness to experience, as shown in Table 37*. The general linear model in Table 38 for those low (bands 1 and 2) on *Openness* clearly demonstrates the contribution of *Organisational Encouragement* and *Challenging Work* to *Creativity*.

A similar pattern emerges for Company 8. Two scales are very high, *Supervisory Encouragement* and (Lack of) *Workload Pressure*, the majority of others being mid-range. *Challenging Work,* very low, is the only scale to correlate significantly in contributing to the mid-range *Creativity*. Some of these findings might be explained by the structure of the organisation where there is a small management support team in the central head office while most of the workforce is located across 15 homes. The sample comprised mainly care home managers and

Table 47 (continued) Comparison of companies on KEYS Scales and NEO-FFI

Co.	N	n	KEYS		Raw Mean	s.d.	KEYS		Correlations with criterion scales	
			Mean	s.d.			Norms	Scale	*Creativity* **p<.01 *p<.05	*Productivity* **p<.01 *p<.05
8	150	15	2.62	.23	2.66	.42	MR	*Organisational Encouragement*	ns	ns
			3.12	.17	3.42	.44	L	*Work Group Support*	ns	ns
			2.99	.22	2.57	.35	VL	*Challenging Work*	.62*	ns
			3.02	.17	3.42	.44	VH	*Supervisory Encouragement*	ns	ns
			2.79	.24	2.86	.55	MR*	*Lack of Organisational Impediments*	ns	ns
			2.42	.18	2.81	.36	VH*	*Lack of Workload Pressure*	ns	ns
			2.92	.22	2.99	.46	MR	*Sufficient Resources*	ns	ns
			2.70	.22	2.65	.54	MR	*Creativity*	1	ns
			2.94	.24	3.04	.39	MR	*Productivity*	ns	1
					3.01	.55		*NEO-FFI Openness to experience*	ns	ns
6	25	15	2.62	.23	2.73	.38	MR	*Organisational Encouragement*	ns	.64
			3.12	.17	3.27	.37	H	*Work Group Support*	.63*	ns
			2.99	.22	2.99	.50	MR	*Challenging Work*	.62**	ns
			3.02	.17	3.16	.42	H	*Supervisory Encouragement*	ns	ns
			2.79	.24	2.96	.34	H*	*Lack of Organisational Impediments*	ns	
			2.42	.18	2.92	.50	VL*	*Lack of Workload Pressure*	ns	-.60*
			2.92	.22	3.01	.50	MR	*Sufficient Resources*	ns	.54*
			2.70	.22	2.58	.63	L	*Creativity*	1	ns
			2.94	.24	3.04	.50	MR	*Productivity*	ns	1
					3.53	.48		*NEO-FFI Openness to experience*	ns	-.69*
5	45	24	2.62	.23	2.31	.47	VL	*Organisational Encouragement*	.76**	.64**
			3.12	.17	3.15	.51	MR	*Work Group Support*	.60*	.60*
			2.99	.22	2.78	.52	L	*Challenging Work*	.85**	.49*
			3.02	.17	2.88	.57	L	*Supervisory Encouragement*	.42*	ns
			2.79	.24	2.96	.40	H*	*Lack of Organisational Impediments*	.42*	.50*
			2.42	.18	2.42	.46	MR*	*Lack of Workload Pressure*	ns	ns
			2.70	.22	2.49	.71	L	*Creativity*	1	.53**
			2.94	.24	2.81	.55	L	*Productivity*	.53**	1
					3.12	.43		*NEO-FFI Openness to experience*		
3	90	30	2.62	.23	2.39	.56	L	*Organisational Encouragement*	.38*	.48**
			3.12	.17	2.90	.57	VL	*Work Group Support*	.42*	.58**
			2.99	.22	2.65	.50	VL	*Challenging Work*	ns	.64**
			3.02	.17	2.65	.54	VL	*Supervisory Encouragement*	.44*	.36
			2.79	.24	2.69	.53	MR	*Lack of Organisational Impediments*	ns	ns
			2.42	.18	2.61	.50	VH	*Lack of Workload Pressure*	ns	ns
			2.70	.22	2.37	.52	VL	*Creativity*	1	ns
			2.94	.24	2.84	.51	MR	*Productivity*	ns	1
					3.25	.50		*NEO-FFI Openness to experience*	.47**	

supervisors which might explain the apparent lack of a shared vision and understanding of creativity and innovation in practice. As this is a recent drive in the organisation it is likely that a more supportive and homogeneous climate might emerge. Two respondents are high on Openness, another very high. Estimated outcomes for the latter fell into the highest band and perceived *Creativity* as low.

Turning to **Company 6**, three scales are high, *Work Group Support, Supervisory Encouragement* and (Lack of) *Organisational impediments.* Others are mid-range or lower. Only *Work Group Support* and *Challenging Work* (mid-range) correlate significantly with *Creativity,* which is low. These represent stimulant scales supportive of *Creativity* for those high on the *Openness* dimension of personality corresponding to Model 4 (Table 40). This is a company where more than two-thirds of respondents fall into the higher bands on *Openness to experience*, which might mask variation. On average those very high on *Openness* and representing 40 percent of this sample perceive their work environment as more supportive, and generate and implement more creative ideas individually. However, no clear picture emerges for contribution to group ideas and implementation. More than half of participants reported time as inhibiting creativity and (lack of) *Workload Pressure* is very low which suggests a highly pressurised work environment, not conducive to creativity. However, the most important factors for improving *Creativity* fell into the categories of *organisational attitudes, structures and procedures* and *management*.

Company 5 is another case where *Creativity* is low. Only one (obstacle) scale falls into the high range, (lack of) *Organisational Impediments*. All others are mid-range or lower. Four stimulant and one obstacle scale correlate significantly with *Creativity* (and *Productivity*). However, many of the scales are low relative to KEYS norms. C*reativity* and innovation are suggested as 'what we do and always has been since we set up'. Support for *Creativity* is described as 'informal rather than formal in an environment that encourages *Creativity* through working relationships, trust and an expectation of innovation.' Analysis of checklist items in Section II of

KEYS suggests that *Teams* and the *Work itself* are perceived as supporting *Creativity*. However, *Organisational attitudes, structures and procedures* and *Management* categories are the source of inhibitory factors. For a company where *Creativity* and innovation are central it is perhaps surprising that only 28 percent of respondents are high or very high on *Openness to experience*. The significance of this personality dimension in this company appears complex. No statistically significant relationships exist for *Openness* with the *Creativity* scale. However, the distribution of *individual* ideas and implementation clearly indicate higher estimations for those very high on *Openness* (band 4).

Company 3 suggests a similar pattern, although many scales are very low, resulting in very low *Creativity,* a unique profile among the case studies in this investigation. Some scales correlate weakly to moderately with *Creativity* (and *Productivity*). Initial discussion with the Managing Director provoked latent interest and interesting qualitative findings emerged, as discussed in the individual case analysis. Management's perceptions on all scales exceeded those for the departments suggesting a lack of shared meaning and unclear creative requirement expectations. Analysis of checklist items suggests that no factors effectively support *Creativity.* In contrast, 53 percent of participants indicated factors within the *Organisational attitudes, structures and procedures* and *Management* categories as most significant in inhibiting and necessary for improving *Creativity.* A highly significant bivariate correlation is evident between the *Openness to experience* dimension of personality and *Creativity*. However, higher levels of *Openness* are more prevalent among higher management. On average those higher on *Openness* generate and implement more ideas, particularly on a group basis.

4.3.6 Similarities and differences between companies

Summarised results by company for the KEYS assessment of creative climate and personality dimensions as measured by the NEO-FFI presented in Table 47 clearly support the significance of factors in the general linear models. In particular, these summaries suggest that

organisational *Creativity* derives from the multiplicative interaction of the level of each factor relative to KEYS norms and the strength of its association with *Creativity.*

Companies 1 and 4

Taking companies 4 and 1 as the first example. In Company 4 *Organisational Encouragement, Work Group Support* and (lack of) *Organisational Impediments* all fall into the very-high range, while *Challenging Work* is low (albeit temporarily). (Lack of) *Workload Pressure* is also very high. Correlations with *Creativity* for the stimulant scales are all very strong and highly significant resulting in a highly supportive climate for *Creativity*. In Company 1 *Organisational Encouragement* is very high, while *Work Group Support* and *Challenging Work* are both high. (Lack of) *Organisational Impediments* is very high while (lack of) *Workload Pressure* is mid-range. Correlations of the stimulant scales with *Creativity* are still highly significant but are less strong than those for Company 4 resulting in the mid-range position. (Lack of) *Work Load Pressure* is not included in general linear models as contributing to *Creativity.* Yet this comparison suggests an association between the level on this factor and the resulting level of supportive climate for creativity, a pattern that continues throughout other companies that are mid-range on *Creativity*, although this seems not to follow through to those companies in the low range.

In this way Companies 1 and 4 represent a close fit with Model 1, the general linear model for *Creativity*. In addition both companies comprised high proportions of respondents high or very high on *Openness* and while the relationship with *Creativity* does not reach significance, in Company 1 significant relationships were evident with individual and group idea generation and implementation.

Further comparison between companies 1 and 4 is important in the exploration of value gained from qualitative analysis of distinguishing

contextual characteristics in an attempt to explain the remaining 53 percent of variance not explained by Model 1:

- Both are involved in scientific research, albeit in unrelated fields.
- Creativity and innovation are highly valued in both companies and is central to the business
- Organisation structures in both are very non-hierarchical
- Both demonstrate a good understanding of creativity and innovation.
- Both have mechanisms in place to harness creative energies and manage the processes so that creativity is sustainable.
- Both have appointed creativity champions
- Both actively network with like-minded companies.
- 62 percent of respondents in Company 1 and 49 percent in Company 4 are high or very-high on *Openness to experience*
- More than 70 percent of respondents in both companies report active participation in creative problem solving training

Clearly there is much similarity between these companies in terms of how they support creativity. Yet, based on respondents' perceptions why is Company 4 very high on *Creativity* while Company 1 is mid-range? In addition to climate differences outlined above, this is likely to stem from the previous management of what was, at that time, a quasi government controlled organisation managed in a highly oppressive, controlling fashion. Company 1 was previously a quasi-government controlled institution and, at the time of data collection, the Chief Executive was 4 years into the process of transformation to one that is supportive and informative as opposed to controlling. As such this provides an excellent example of how a staid, conservative organisational culture is being transformed to an innovative one, an organisation precisely of the type suggested as necessary for research (Martin 2002). Company 4, on the

other hand, is a privately owned research organisation where creativity is institutionalised through organisational culture and continues to transform.

Companies 2, 6 and 3

The second comparison consists of Companies 2, 6 and 3 based on summaries in Table 46, which highlights similarities and differences. All three companies are allied to the advertising and marketing sector, some much more directly. Company 2 is very high on *Organisational Encouragement* and *Work Group Support*, low on *Challenging Work* and high on (lack of) *Organisational Impediments*. Of the KEYS scales, only *Work Group Support* and *Challenging Work* are significantly associated with *Creativity.* A significant relationship is also evident for *Openness*. Company 2 is an example of the significance of *Challenging Work* (low) and *Work Group Support* (mid-range) the interaction of which lead to *Creativity* that is mid-range. Further, the relevance of (lack of) *Workload Pressure* is suggested. This was the most frequently reported factor inhibiting *Creativity*. In respect of support for *Creativity,* the categories of *organisational attitudes, structures and procedures*, *management* and *teams* together comprised 80 per cent of responses.

For Company 6 *Organisational Encouragement* and *Challenging Work* are mid-range, *Work Group Support*, *Supervisory Encouragement* and (lack of) *Organisational Impediments* are mid-range. Two-thirds of respondents in this company are high or very high on *Openness*. While the relationship with *Creativity* is not statistically significant, on average those very high (band 4) on *Openness* perceive the climate as more highly creative, generate and implement a greater number of creative ideas. Again, significant relationships with *Creativity* are evident for *Work Group Support* and *Challenging Work*, which is supportive of the general linear model for those very high on *Openness*. *Workload Pressure* is represents a significant factor contributing to low *Creativity.*

In Company 3 most stimulant scales are low or very low, while (lack of) *Organisational Impediments* is mid-range and (lack of) *Workload Pressure* is very high, leading to *Creativity* that is very low. This company presents some interesting observations relevant to this investigation. In previous examples, (lack of) *Workload Pressure* is suggested as intervening in the multiplicative interaction of factors suggested by the general linear models developed through this investigation. In this company (lack of) *Workload Pressure* has no effect on the multiplicative interaction of stimulants or obstacles. One-third of participants are high or very high on *Openness* for who a highly significant relationship with *Creativity* is suggested. In contrast to Companies 2 and 6 that represent examples of the general linear model for those high on *Openness*, this is not suggested for Company 3 as the proportion is lower. Companies 2 and 6 also suggest a direct interaction between *Challenging Work* and (Lack of) *Workload Pressure*, originally postulated as positive and negative pressures, in relation to *Creativity.* Again, this is not suggested for Company 3. However, this company has a very interesting contribution in terms of what it means to be creative and innovative. Whereas, creativity and innovation are highly desirable, valued and expected in Companies 2 and 6 this is much less so for Company 3. On initial contact with this company the Managing Director suggested that the company was not creative in the slightest but perhaps they ought to be, later qualifying this as perhaps relative to the world of marketing and advertising with which they are associated. Knowledge and understanding of creativity was evident from an interview with the MD although shared understanding was lacking. What is clear from this company is the lack of creative requirement (Shalley, Gilson et al. 2000; Unsworth, Wall et al. 2002) that is deemed important to companies in stimulating creativity.

- All three companies ally to the world of advertising and marketing, Company 3 less directly.
- At the time of data collection the MD and HR Director had been in post for 2 years and were in the process of transforming Company 2 from

what was a command and control culture. As such this might represent a typical organisation for research into how what was a staid, conservative organisational culture is being transformed into an innovative one (Martin 2002).

- Company 6 has been owner-managed for more than 10 years and Company 3 was owned and managed by the MD and Company Secretary, both ex-Ashridge graduates of a prestigious Management College
- Creativity and innovation are highly desired valued and expected in Companies 2 and 6, are central to the business and both companies actively aspire towards creativity and innovation
- In Company 3 creativity and innovation were quite desirable but the expectation value and priority afforded were all quite low. Not actively aspiring towards creativity
- Organisation structures in all are non-hierarchical and teamwork was suggested as important in Companies 2 and 6
- Companies 2 and 6 both demonstrate a good understanding of creativity and innovation, Company 3 at director level only
- Company 2 was in the process of initiating mechanisms to harness creative energies and manage the processes so that creativity is sustainable, including appointment of a creativity champion
- No evidence of mechanisms to harness creative energies and manage the processes in Companies 3 and 6 and no creativity champions
- Some evidence of networking in Company 2 with other companies aspiring towards creativity, no evidence in Companies 3 and 6
- Categories of Organisational attitudes, structures and procedures and Management reported as supportive by 47 percent of respondents in Company 2
- Teams or co-workers were reported as supportive by 42 percent of respondents in Company 6

- 53 per cent of respondents in Company 3 reported factors in the categories of Organisational attitudes structures and procedures and Management as inhibiting and necessary to improve creativity and innovation
- High *Workload Pressure* in Company 6, 51 percent reported as inhibiting
- Mid-range *Workload Pressure* in Company 2, 29 per cent reported as inhibiting
- Low *Workload Pressure* in Company 3
- Lack of integration and huge variation between departments in Company 2
- No departmental analysis in Company 6
- Some differences between senior management and departments but little variation between main two operational units in Company 3
- 67, 54 and 33 percent of respondents are high or very-high on *Openness* in Companies 6, 2 and 3 respectively
- 37-40 percent of respondents in all three companies reported participation in creative problem solving training

Clearly similarities and differences exist between these three companies as outlined in the bulleted list, the most important of which are evident in Company 3 that is very-low on *Creativity*, does not actively aspire towards creativity and displays a lack of creative requirement from the workforce. This raises interesting issues surrounding what it means to be creative and innovative, as suggested in the extracts from interviews.

It is useful to consider the feasibility of an at least partial alternative or additional explanation for creativity in these organisations. All three are to a greater or lesser degree allied to the world of advertising and marketing that are traditionally highly creative. Yet why are none of these three

organisations above mid-range on *Creativity*? In a recent study of two UK advertising agencies by Ensor et al (2006) *Creativity* was similarly found to be mid-range. It is possible that participants' reports are relative to what is perceived as a more highly creative field.

Companies 7, 8 and 5

Remaining companies are perhaps notable by their individuality that precludes meaningful direct comparison. Company 7 as a micro organisation is the smallest of the cases comprising 8 staff, 6 participants. Stimulant scales range from high to very low; both obstacle scales are very high resulting in *Creativity* that is mid-range. Only *Organisational Encouragement* and *Challenging Work* were significantly associated with *Creativity*, which supports the general linear model for those low on *Openness* (Model2), representing 83 percent (5 of 6) of participants in this company. (Lack of) *Workload Pressure* in this organisation is very high and, again, suggests neutrality in multiplicative interaction of factors supporting or inhibiting creativity. Regardless of the positioning of (lack of) *Workload Pressure* as very-high two-thirds of respondents indicate time as inhibiting creativity and innovation. The expectation of creativity in the absence of a shared vision and supportive mechanisms does have much in common with Company 3, although Company 7 *aims* to be supportive.

- Creativity and innovation suggested by owner as very-highly desired, highly expected and valued and given quite a high priority
- 83 percent are low or very-low on *Openness*
- Anomaly between very-high (lack of) *Workload Pressure* and checklist items where two-thirds reported time as inhibiting *Creativity*
- None has been trained in creative problem solving
- No mechanisms in place to support creativity
- The owner and only chartered accountant is high on *Openness* and has a vision for the company but it appears not to be shared among staff

Company 8 is a registered charity with an intended sample representative of care home managers, supervisors and management at the central support office Respondents mainly comprised managers of care homes. Stimulant scales range from very high, *Supervisory Encouragement* and (lack of) *Workload Pressure*, to very low, *Challenging Work*, resulting in *Creativity* that is mid-range. A significant relationship is suggested for *Challenging Work* with *Creativity,* which is only partially supportive of resulting models where *Challenging Work* accounts for the most variance. This company currently fits none of the general linear models well.

- Creativity and innovation are highly valued, although the expectation and priority might be lower
- No mechanisms in place to support creativity
- 27 percent have participated in creative problem solving training
- 80 per cent low or very low on *Openness*
- Care home managers geographically dispersed
- How successfully can the passions and beliefs of central management and some care home managers reignite motivations
- No excessive time pressures

The strap line of Company 5 emphasises quality innovations and creativity and innovation are suggested as 'what we do and always has been since we set up over a decade ago'. This is likely to represent another company typical of those in which research is necessary, in this case, to explore how what was a highly innovative culture has diminished (Martin 2002). Participants comprise specialist engineers. Creativity and innovation are very highly desired and valued, highly expected and given high priority. On this basis it would be reasonable to assume that *Creativity* would be very high. However, *Creativity* is low in this company. W*ork Group Support* is mid-range, *Challenging Work* and *Supervisory Encouragement* are low, and *Organisational Encouragement* is very low. In respect of the

obstacle scales (lack of) *Organisational Impediments* is high and (lack of) *Workload Pressure* is mid-range. Significant relationships are suggested for most scales with *Creativity* and *Productivity* from which it might be suggested that this company best fits the overall general linear model. Although, the strongest and most highly significant for *Creativity* being *Organisational Encouragement* and *Challenging Work* would suggest Model 2, for those low or very low on *Openness (*72 percent). Factors supporting *Creativity* mainly fall into the categories of *teams*, *co-workers* and the *work itself*. The highest category for inhibiting factors was *organisational attitudes, structures and procedures*, including *risk avoidance*, and *Management's lack of clear vision.*

- Creativity and innovation are very highly desired and valued and highly expected and given priority
- Strap line emphasises quality innovation
- Claim to provide an environment that 'encourages innovation informally through working relationships, trust and the expectation of creativity'
- Creativity is low
- No formal mechanisms to stimulate creativity
- 95 percent report no training in creative problem solving
- 72 percent low or very-low on *Openness*
- Sample is 75 percent male and 75 percent over the age of 35, more than 50 percent 10 years' tenure
- Highly experienced specialist engineers
- Departmental variation – central support and AE lower than Company 5 overall, SST and UAV higher

4.4 Summary of Findings

The analysis of case studies presented here both independently and collectively involved the investigation of interrelationships with a number of outcome measures. These are individual and group idea generation, implementation, and *Creativity.* For individual and group idea generation and implementation, analysis of variance confirms differences in outcomes for the KEYS *Challenging Work*, (lack of) *Workload Pressure* and the *Creativity* scales and for the *Openness to experience* and *Extraversion* dimensions of personality. Post hoc tests supported variance for the very-high and very-low extremes of these outcomes for all factors and for (lack of) *Workload Pressure* and the *Creativity* criterion across all ranges of these outcomes. This analysis provides support for the significance of the positive pressure of challenging work and optimal rather than excessive time and workload pressures in contributing to individual and group idea generation and implementation.

In respect of the KEYS assessment of creative climate analysis of variance confirms differences between companies on all scales with the exception only of *Freedom* and for three personality dimensions, *Openness to experience*, *Extraversion* and *Conscientiousness*. Post hoc tests supported differences between companies at the very-high or very-low extremes of the KEYS scales, although not for the personality dimensions. Elimination of multicollinearity allowed the development of a general linear model for *Creativity* that provides evidence for three KEYS stimulant scales, one obstacle scale and one personality dimension of the Five Factor Model in contributing 47 percent of variance between participating companies. The stimulant scales are *Organisational Encouragement*, *Work Group Support* and *Challenging Work*, all Tier 1 scales that most strongly differentiate between high and low creative environments. The obstacle scale (lack of) *Organisational Impediments* is one of the Tier 2 scales, the next strongest differentiator. The personality dimension in this model is *Openness to experience* that traditionally has been linked with creativity in work organisations.

Based on the analysis of personality dimensions in this investigation the non-significance of post hoc tests and the significant, if small, contribution to the general linear model of *Openness to experience*, the relationship with creativity appears complex. Therefore, this dimension was subjected to further analysis. In respect of the outcomes for individual and group idea generation and implementation analysis provided clear evidence that on average all four outcomes are greater for those higher on *Openness*. General linear models were explored for *Creativity* based on each of the four bands of the *Openness* dimension, as reported by individual participants across companies. For bands 1 (very-low) and 2 (low) similar factors emerged resulting in Model 2 for those low on *Openness to experience* that suggests the importance of *Organisational Encouragement* and *Challenging Work* in contributing 29 per cent of variance. For bands 3 (high) and 4 (very-high) factors emerging were quite different. For band 3 *Organisational Encouragement*, *Challenging Work*, *Supervisory Encouragement* and (lack of) *Organisational Impediments* together are suggested to contribute 43 per cent variance. For those very high on *Openness to experience* two of the Tier 1 scales, *Challenging Work* and *Work Group Support,* interact to contribute almost 60 percent variance. This provides strong evidence that those high and low on *Openness to experience* benefit from different elements of a supportive climate. Might this suggest a moderating or mediating effect? This has potential implications for managing individuals dependent on the degree of this personality dimension and suggests the need for differential support within business organisations.

Finally, analysis focussed on the qualitative characteristics of participating companies and meaning emerging from interviews, website information, checklist items of section two of KEYS and scale item analysis that did not form a part of the general linear models developed from quantitative analysis. It is suggested that organisational creativity derives from the multiplicative interaction of the level of the company on each of the KEYS scales and the strength of the association with *Creativity.* Similarities and

differences between participating companies have been analysed to highlight important differences beyond the contribution suggested by Model 1in explaining variation between companies. In this way, an attempt is made to explain the remaining 53 percent of variance between companies based on contextual and individual characteristics. This analysis supports and extends quantitative analysis and provides strong support for the significance of meaning, values and other contextual factors to supporting organisational creativity.

Chapter 5: Discussion

Driven by the rhetoric versus practice of business creativity and the limitations of fragmented research in informing effective facilitation, during the period of this investigation economic downturn has placed an even greater requirement on business organisations to develop creative and innovative solutions. This period has also witnessed increased interest from academics, practitioners and government bodies and there has been some progress in how Human Resource Management and Development support business creativity. Therefore, this investigation provides a valuable and timely contribution to the knowledge and understanding of how creativity might be facilitated in business organisations. This chapter explores the implications for theory and practice of the findings resulting from quantitative and qualitative analyses detailed in Chapter 4. This is structured on the main findings starting with quantitative outcomes before progressing to qualitative findings in an attempt to contribute additional variance to that explained by the quantitative general linear model(s). Synthesis of outcomes and implications are subsequently explored in relation to human resource management. Ultimately a model is developed that integrates the findings with HRM and HRD to extend theoretical understanding and practical application in both disciplines of how to stimulate, support and sustain organisational creativity.

5.1 Quantitative Outcomes

This investigation employed two main sets of quantitative outcome measures:

a. *Participants' estimates of individual and group idea generation and implementation* banded relative to the range by company and analysed across the entire sample (n = 209)
b. *KEYS climate survey* based on mean perceptions by company and the *Five-Factor Model of personality as measured by the NEOFFI*.

Exploration of similarities and differences between the two main sets of quantitative outcome measures potentially lead to important implications and explanations.

5.1.1 Participants' estimates of ideas generated and implemented

Unlike previous studies based on expert judgements or patent disclosures, for example, the first of these represent participants' estimations of individual and group idea generation and implementation. Measures of creativity are necessarily highly subjective in resulting from social validation based on what is meaningful and valued in a given context. For business organisations meaning and value derive from a combination of historical antecedents, values and attitudes of the directorate and senior management. Neither patents nor expert judgements overcome such problems, deferring social validation to third parties whose values might be very different to those within a business organisation. In requesting estimates for the number of individual and group ideas generated and implemented over the previous two-year period the intention was to gain relatively tangible measures that reflect the interaction of individual, social and organisational characteristics.

Analysis of variance by band for participants' estimates was highly significant for three KEYS assessment of creative climate scales, *Challenging Work*, (lack of) *Workload Pressure, Creativity (*criterion scale), and with two personality dimensions as measured by the NEO-FFI, *Openness to experience* and *Extraversion*. Post hoc tests supported variance between the very-high and very-low outcomes for *Challenging Work* and the personality dimensions *Openness to experience* and *Extraversion* (Figure 4-28). This suggests the significance of a sense of having to work hard on challenging tasks and important projects and infers intrinsic motivation requiring some degree of pressure. Simply, challenge and the personality dimensions of *Openness to experience* and *Extraversion* are significant in differentiating between the highest and lowest bands for numbers of ideas generated and implemented for

individuals and for groups. In contrast post hoc tests support variance across most individual and group idea generation and outcome bands for (lack of) *Workload Pressure* and *Creativity. Challenging Work* and *Work Load Pressure,* an obstacle scale*,* respectively represent positive and negative pressures. However, rather than a complete absence of time or workload pressures, the obstacle scale is concerned with the detrimental effect of extreme pressures and unrealistic expectations in killing creativity. This is significant between all bands on these four outcomes suggesting that on average, those who perceive extreme pressures generate and implement fewer ideas. A similar relationship exists for *Creativity,* a criterion scale, which is to be expected. On average, those who perceived the climate as supportive of creativity reported greater idea generation and implementation. In addressing RQ1, these findings demonstrate a relationship between individual and group idea generation and implementation with a supportive organisational climate and personality dimensions and the absence of any differences between outcomes.

5.1.2 KEYS Creative Climate and NEOFFI Personality Dimensions

Analysis of variance provided evidence of highly significant variance between participating companies for all KEYS scales, with the exception of *Freedom*, and for the *Openness to experience*, *Conscientiousness* and *Extraversion* dimensions of personality as measured by the NEO-FFI. While post hoc tests supported differences between companies for KEYS scales, particularly between the very high and very-low ranges, these failed to support variance between companies for the personality dimensions.

However, the development of the overall general linear model (Model 1) highlights the contribution of *Openness to Experience* to creativity. Further exploration of this dimension led to interesting alternative models where different combinations of factors are suggested as significant depending on the degree of *Openness to experience* based on bandings, very low, low, high or very high. Factors contributing to variance in *Creativity* for

each of these models is summarised in Table 48, supporting Amabile's (1997) findings and extending these to include a personality dimension in the overall model and exploring the implications of alternative models.

Table 48 Comparison of factors contributing to variance in *Creativity*

Models / ***Factors***	***1***	*Openness to experience Bands*		
		2	***3***	***4***
Openness to experience	*4*	*Very/Low*	*High*	*Very High*
Organisational Encouragement	*4*	*10*	*7*	*-*
Work Group Support	*4*	*-*	*-*	*41*
Challenging Work	*13*	*10*	*20*	*19*
(Lack of) Organisational Impediments	*4*	*-*	*10*	*-*
Supervisory Encouragement	*-*	*-*	*7*	*-*
% Variance	*47*	*29*	*44*	*60*

5.1.3 Model 1

The optimal estimation model by company based on KEYS stimulant and obstacle scales and personality dimensions as measured by the NEO-FFI supports *Organisational Encouragement*, *Work Group Support*, *Challenging Work* (all Tier 1 scales), (lack of) *Organisational Impediments* (Tier 2) and *Openness to experience* in contributing a highly significant 47 percent of variance in *Creativity.* Of these factors, only two were also associated with the first set of outcomes, participants' estimates of individual and group idea generation and implementation: *Challenging Work* and *Openness to experience.* This suggests the direct influence of these factors on individual behaviour. With the exception of *Supervisory Encouragement* the model developed from participating companies is supportive of the suggestion that,

> "the differences between high- and low-creativity projects on five dimensions were striking, In particular, positive *Challenge* in the *Work*, *Organisational Encouragement*, *Work Group Support*s, *Supervisory Encouragement* and *Organisational Impediments* may play an important role in influencing creative behaviour in organisations." (Amabile 1997:49)

The authors (Ensor, Pirrie et al. 2006) of the only other investigation of climate using KEYS during the period of the present investigation also

found support for three of Amabile's (1997:49) five dimensions, *Organisational Encouragement*, (lack of) *Organisational Impediments* and *Work Group Support*. Somewhat surprisingly given the context of their study in two London-based advertising agencies these authors found *Challenging Work* was very low. However, this study investigated significant differences of the dimensions from KEYS norms rather than relationships of the scales to *Creativity* and other outcomes as is the case in the present investigation.

The implications of each of the factors contributing to the general linear models summarised in Table 48 are now explored.

5.1.3.1 *Organisational Encouragement*

Organisational Encouragement represents an organisational climate that encourages creativity through the fair, constructive judgement of ideas, reward and recognition for creative work, mechanisms for developing new ideas, an active flow of ideas and a shared vision of what the organisation is trying to do. Examples of scale items include *'In this organisation top management expects that people will do creative work', 'Failure is acceptable in this organisation if the effort on the project was good', 'People in this organisation can express unusual ideas without the fear of being called stupid'* and *'People are encouraged to take risks in this organisation'*. Some items in this scale are not dissimilar to concepts suggested by others, for example, the open flow of communication across different groups in the organisation (Kanter 1983; Angle 1989) and the sharing of expertise between departments.

Early creativity research suggested that the probability of creative idea generation increases as exposure to other potentially relevant ideas increases (Osborn 1963; Parnes and Noller 1972). In a supportive climate new ideas are encouraged and received enthusiastically by managers, peers and subordinates and possibilities are presented for trying out new ideas in a non-hierarchical environment. While reward is most often

perceived as an extrinsic motivator reward and recognition also represents an aspect of this stimulant scale as creativity can be enhanced through intrinsic factors such as confirmation of competence, a means to more interesting work, career progression or greater responsibility.

An important consideration is the considerable overlap of items in this scale with many of the qualitative outcomes. For example, shared vision and open communication, freedom to express ideas, acceptability of failure, risk taking and supportive mechanisms. This raises questions on the effectiveness of quantitative measures, such as KEYS, to tap into these factors in the necessary breadth and depth. For example, within KEYS, mechanisms are unspecified beyond support for new ideas or implementation.

5.1.3.2 *Challenging Work*

The perception of working hard on challenging tasks and important projects as measured by the *Challenging Work* scale is highly significant. Examples of scale items include '*I feel challenged by the work I am currently doing'* and *'the organisation has an urgent need for successful completion of the work I am now doing'*. Not only is intellectual challenge likely to be intrinsically motivating but is likely to have a positive effect on commitment. Challenging Work is developmental and potentially supports career progression. Recognition of the value of individual contributions to the work of organisation is again likely to be intrinsically motivating and to provide a sense of meaning and involvement.

Findings of this investigation are highly significant in recognising this factor as supportive of creativity for both sets of quantitative outcome measures, which has implications for individual creative behaviour. For the *Creativity* criterion, all models support the significance of *Challenging Work,* but particularly for those high or very high on *Openness to experience.* Importantly, *Challenging Work* is associated with *Creativity* rather than *Productivity*, to which far less variance is contributed by this factor (Tables 31 and 32).

As one of the two pressure scales based on the KEYS assessment of creative climate, *Challenging Work* is perceived as a positive, intrinsically motivating and intellectually demanding pressure. However, a degree of *Workload Pressure* is also likely to be challenging and motivating, while excessive time pressure is likely to kill creativity. Creative challenge demands time for the creative process and structuring in thinking time for creativity is likely to maximise outcomes as is evident from findings that creative people planned time away to think and to allow ideas to percolate (Zuckerman and Cole 1994; Gick and Lockhart 1995), which overlaps with the *incubation* stage of the creative process. From the perspective of HRM flexible work practices are supportive of creativity. For example, flexible hours or home working provides time and space potentially to maximise work time and creativity.

5.1.3.3 *Work Group Support*

Work Group Support represents a diversely skilled work group in which people communicate well, are open to new ideas, constructively challenge each other's work, trust and help each other and feel committed to the work they are doing. Examples of items for this scale include *'Within my work group we challenge each other's ideas in a constructive way'* and *'my co-workers and I make a good team*'. Trust determines the perceived degree of emotional safety or security in relationships allowing individuals to be totally open, respect and support each other. Work group diversity allows for integration and interaction with others who might possess creativity relevant skills and characteristics and encourages exchange of ideas from members with different frames of reference (ibid). In this way others in the work group might act as role models or mentors in stimulating organisational creativity. It has been suggested that in workplace situations, individuals not only observe the behaviours modelled by others but actually retain an interpretation of how to behave in that situation for later use in similar situations (Bandura 1969; Shalley and Perry-Smith 2001). Modelling by more experienced role models has been found to be important to the development of creativity (Zuckerman 1977). Based on

companies participating in this investigation *Work Group Support* is demonstrated as contributing 4 percent variance overall to Model 1. However, for those very high on *Openness to experience* the resulting Model 4 demonstrates the significance of *Work Group Support* in contributing a substantial 41percent variance in *Creativity.*

5.1.3.4 *Organisational Impediments*

(Lack of) *Organisational Impediments* is one of the two obstacle scales, representing an organisational culture that impedes creativity through internal political problems, harsh criticism of new ideas, destructive internal competition, an avoidance of risk and an over emphasis on the status quo. Central to many items in this scale is the notion of control that obstructs creative behaviour through a negative effect on intrinsic motivation. Examples of scale items include *'This organisation is strictly controlled by upper management'*, *'People in this organisation are very concerned about protecting their territory'*, '*Top management does not want to take risks*' and '*Other areas of the organisation hinder my project(s)'.*

Findings of this investigation demonstrate the significance of this scale overall in Model 1. However, analysis by *Openness to experience* bands indicates the main contribution is for those high (Model 3) on this personality dimension. For those low or very high on *Openness, Organisational Impediments* appeared non-significant. Simply, this suggests that Organisational Impediments have little effect for those in the very low and low bands and that those in the very-high band are likely to be independent creators, uninhibited by barriers in the organisation.

As with *Organisational Encouragement* items measured by this scale overlap with many of the qualitative outcomes, for example, senior management control, attitude to risk and supportive mechanisms, which again raises questions as to the effectiveness of quantitative measures, such as KEYS, to tap into these factors in sufficient breadth and depth?

5.1.3.5 *Openness to experience*

As the only personality dimension demonstrated as significant to Model 1, the 4 percent contribution of variance in *Creativity, w*hile small, is comparable to the magnitude of variance explained by *Organisational Encouragement*, *Work Group Support* and (lack of) *Organisational Impediments.* Highly significant relationships were also demonstrated with individual and group idea generation and implementation. However, the effect of this personality dimension is demonstrated as somewhat of an anomaly. Post hoc tests that demonstrated a lack of statistically significant variance between companies using the Bonferroni method, which errs on the side of caution, increases the chance that genuine differences in data might be missed (Hair, Black et al. 2006). Exploration of estimation models by *Openness to experience* bands suggests significant differences in contributory factors that are potentially important to advancing the theory and practice of how to facilitate organisational creativity.

Openness to experience is the dimension frequently associated with creativity (e.g. Feist 1998; 1999). It is suggested that more open individuals are not only more flexible in absorbing information and combining new and unrelated information but also have a greater need to seek out unfamiliar situations that allow access to new experiences (McCrae and Costa 1997), creating valuable reserves of knowledge on which their intellectual curiosity might draw. As more ideas or other stimuli are activated simultaneously, greater potential exists for contact between previously unrelated ideas, which ties in to the earlier discussion of cognitive processing. This is important for creativity in two ways: firstly, a wide attention span raises awareness of problem opportunities and secondly, increases the potential for the generation of new ideas. Researchers suggest that creative individuals are able to make connections among ideas that less creative individuals do not (e.g. Feist 1993) possibly because of the ability to spread their attention more widely, facilitating sensitivity to a wider range of stimuli (Martindale 1989; Martindale 1995). It has been suggested that more open individuals are

not only more flexible in absorbing information and combining new and unrelated information but also have a greater need to seek out unfamiliar situations that allow access to new experiences (McCrae and Costa 1997), hunger for knowledge creating valuable reserves on which their intellectual curiosity might draw. As more ideas or other stimuli activate simultaneously, greater potential exists for contact between previously unrelated ideas. However, the identification of pairs of contrasting traits (Table 4) illustrate the complexity of personality for creative individuals leading to the suggestion that the 'creative' individual is someone who can successfully operate at both polarities (Csikszentmihalyi 1996:76). This is not unrelated to the argument for too much expertise in a field versus diverse experiences that provides greater potential for stimulation between tacit knowledge and associational relationships (Mumford 2000).

A quotation extracted from one of the interviewees supports this:

> "From my experience, those who are most creative tend also to be most receptive ... those who are reasonably receptive to talking about new things tend to be able to spark more ideas ..." (Company 7 interviewee:246)

Another interview quotation is important in considering potential barriers for creativity:

> Frustration is sensed within the creative team at not being able to use their creativity as much and as freely as they would like, particularly as their involvement is frequently towards the end of the process which allows them little or no input to planning and means they frequently have to rush their input (Company 2 Interviewee 2:414)

From the perspective of HRM, personality dimensions are most significant in selection and development decisions. While not specifically investigated

it is possible that different poles are necessary to various stages of the creativity and innovation processes. For example, while *Openness to Experience* is significant to the generation and implementation of ideas, there is some suggestion that *Extraversion* is related to implementation of ideas due to the need for communication and persuasion. This is supportive of the suggestion that successful creative people are often gifted in sales (Dudeck and Hall 1991). However, *Introversion* is related to focussed attention, the subjectivity of passion for one's work must be balanced with objectivity, and divergence in the creative process must be balanced with convergence. From the perspective of sustainability there is evidence that talented people such as creative scientists sought out and were more likely to work with other creative scientists (Zuckerman 1979) which has implications for attracting those with the necessary expertise and creativity skills. Yet the need remains to develop a workforce with a range of characteristics and skills and who work effectively together. Is it desirable to employ people who are all very high on *Openness to Experience*?

Organisational cultures that stress the value of innovation, autonomy, human resources and collaboration appear more likely to produce innovative products (Arad, Hanson et al. 1997; Mumford and Simonton 1997) and cultural values are also likely to attract talented creative people (Mumford 2000). The following quotation extracted from an interview with a very creative participant highlights some important cognitive and practical elements of the creative process:

> "...even when I am lying in bed at night... you know at that time before you go to sleep when your brain is just chugging over, I find that quite a good time to come up with good ideas (190) ... for me sometimes its conscious sometimes it isn't. I can train myself to see the outcomes ... trial and error. ... Or I might take ideas elsewhere. ... It's also to do with the information you're given – the brief. We had a lot of information and were able to put the pieces together to get a

> better picture of what it should be. But some clients, it's a bit more flexible ... there are so many possibilities.... sometimes you just know it's right ... other days you might doodle all day and achieve nothing and then come in the next day with THE idea. But I believe that if you are creative you are creative ... and you can turn your hand to almost anything." (Company 6 interviewee 2:197)

Effective recruitment and selection necessitates a combination of techniques. Individual and group exercises, incorporating problem solving tasks, are suggested to complement other methods including psychometric testing and panel interviews that give applicants the opportunity to give examples of past successes and failures in relation to their creative and innovative endeavours, including any experiences of participation in creative problem solving training. This investigation demonstrated a highly significant relationship between *Openness to experience* and participation in creative problem solving training, while noting that it is difficult to infer direction or causality. Does training in creative problem solving increase *Openness to experience* or do those higher in this personality dimension seek out opportunities for training? Intuitively the former is likely to provide the more plausible explanation.

Resulting from further analysis of quantitative data by bandings *Openness to Experience* is emerging as a moderating variable rather than as a multiplicative factor as suggested by the interactionist models of creativity (e.g. Woodman, Sawyer et al. 1993; Amabile 1996). This has potentially enormous implications in facilitating organisational creativity. This is particularly significant as the data from this investigation overall supports a general linear model that accounts for almost 47 percent of variance based on four of the five factors suggested as most important to facilitating creativity in work organisations (Amabile 1997:49). Implications of alternative Models 2-4 are explored following a consideration of fit for Model 1.

5.1.3.6 Model Fit

Companies 1 and 4 that appear to be the most supportive of creativity best fit Model 1, the overall general linear model that suggests *Organisational Encouragement, Challenging Work, Work Group Support, (lack of Organisational Impediments)* and *Openness to experience* contribute almost 47 percent variance between companies. Qualitative analysis suggests that these companies share many distinguishing characteristics that help to explain additional variance between companies. Both are in research and development where creativity is essential, although in very different sectors and with very different histories. In Company 4 creativity is historically institutionalised and regardless of extensive downsizing in its relatively recent past maintains a highly supportive climate that appeared almost euphoric immediately afterwards. However, Company 1 was at the time a few years into a major cultural transformation following the appointment of the new CEO, which is likely to be reflected in workforce perceptions. At the other end of the scale of supportive climate this model also appears to provide the best fit for Company 3, the only case where *Creativity* is very-low, although much more weakly as would be expected. Company 3 demonstrates none of the positive distinguishing characteristics that help to explain greater support for creativity and, unlike companies 1 and 4 where large proportions of respondents are high or very high on *Openness* most respondents in Company 3 are low or very low on this dimension.

5.1.4 Model 2

For respondents low on *Openness to Experience (*Bands 1 and 2) there is evidence for the contributions of *Organisational Encouragement* and *Challenging Work* to the optimal model that accounts for 29 per cent of variance in *Creativity*. The contribution of other factors, including *Work Group Support, Organisational Impediments and Supervisory Encouragement* are suggested insignificant to this model. Model 2, therefore, is presented as a simple, parsimonious model. However, interactionist models are deemed multiplicative and it is unrealistic to

expect that organisational support and challenging work alone will result in creative outcomes for those low on creativity relevant characteristics. Complexities are demonstrated below through discussion of participating companies that most closely fit this model.

5.1.4.1 Model Fit

Companies 5, 7 and 8 best fit Model 2 that suggests *Organisational Encouragement* and *Challenging Work* contribute 29 percent variance in those low or very low on *Openness*. These companies are in very different sectors and the majority of the workforces in all are low or very low on *Openness to Experience*. What they have in common is that they are all mid-range to low on *Creativity* and that all lack a shared meaning and understanding of what it means to be creative and innovative in practice. In Company 5 creativity and innovation are assumed to be institutionalised at the heart of the organisation yet clearly this is not effective in stimulating and sustaining such requirements in the absence of a supportive climate and greater work challenge. There is a striking contrast between the attitudes of the MD and perceptions of the workforce. As such this represents a good case for analysis into how an innovative culture might diminish (Martin 2002) over time if not continuously ignited. Company 4, where creativity and innovation are similarly institutionalised, actively stimulate and support these processes to ensure their sustainability. In Company 7 the owner and only chartered accountant is high on *Openness to Experience* and actively aspires to organisational creativity. Yet there appears to be a huge gap between this and staff perceptions, all of who are low on *Openness* and perceive a lack of challenge and organisational support. Company 8 represents a very similar profile although central support management have initiated actions aimed at reigniting the passion and enthusiasm throughout the geographically dispersed care home managers and deputies. Some are very actively creative, others remain less so. So again, this is a company that is very much in the process of transformation that is not yet reflected

in workforce perceptions and of the type suggested for research into how a staid, conservative organisational culture might become an innovative one.

5.1.5 Model 3

For those high on *Openness* (Band 3) a more complex model emerges highlighting the contribution of *Challenging Work*, *Organisational Encouragement*, *Supervisory Encouragement* and (lack of) *Organisational Impediments* to account for almost 44 percent of variance in *Creativity*. Of the models based on *Openness* bands, this is the only one that incorporates four of the five dimensions deemed most important in supporting creativity (Amabile 1997). *Organisational Impediments* and *Supervisory Encouragement* contribute significantly to creativity only for individuals high on *Openness to experience.* Simply, this suggests that *Organisational Impediments* have little effect for those in the very low and low *Openness* bands and that those in the very-high band are likely to be independent creators, uninhibited by barriers in the organisation. In contrast to factors contributing overall to Model 1, *Supervisory Encouragement* replaces *Work Group Support.* Therefore, this presents an interesting model that emphasises organisational and management support for those high on *Openness to Experience* and, therefore, with potential to be creative, yet not at the extreme, as with Model 4.

5.1.5.1 *Supervisory Encouragement*

Supervisory Encouragement is alone among the five scales identified as most significant to creativity (Amabile 1997) in not contributing to Model 1 based on participating companies. This is interesting, particularly as this is one of the dimensions, together with co-worker support, most frequently investigated, as suggested by the discussion of fragmented approaches outlined in Chapter 2.

Supervisory Encouragement refers to a supervisor or line manager who supports communication and collaboration, shows confidence in the work group, sets appropriate goals and values individual contributions. Examples of items in this scale include: *My supervisor serves as a good*

work model, I get constructive feedback about my work, and *My supervisor is open to new ideas.* In common with this investigation lack of support for *Supervisory Encouragement* has also been reported in another study published during the period of this investigation (Ensor, Pirrie et al. 2006). However, *Supervisory Encouragement*, is demonstrated as a significant contributor to *Creativity* for those individuals high (Band 3) on *Openness to experience.*

Case *c*omparisons demonstrate significant relationships with *Creativity* for only three companies, fewer than for *Productivity*. A possible explanation for the absence of this dimension overall in Model 1 might be the sample of companies. All are small-medium sized businesses (8-150 employees) with the exception of two that represent the UK undertakings of larger companies but operate entirely independently and autonomously. All are relatively non-hierarchical in structure. No single case among those participating in the current investigation provides a good fit for Model 3.

5.1.6 Model 4

Perhaps the most striking model emerges for those respondents very high on *Openness to Experience* (Band 4). This model accounts for almost 60 percent of variance in *Creativity* through the contribution of only two KEYS dimensions, *Challenging Work* and *Work Group Support*. While the latter contributes 4 percent variance overall to Model 1, *Work Group Support* contributes a substantial 41 percent variance to Model 4. *Challenging Work* is significant across all bands, although making a greater contribution to *Creativity* for those high (20%) and very high (19%) on Openness to Experience. This is supportive of previous findings that suggest the significance of creativity relevant characteristics and complex, challenging jobs (Oldham and Cummings 1996).

Findings of this investigation clearly demonstrate the significance of *Organisational Encouragement* to Models 1, 2 and 3 but for those individuals very high on *Openness to Experience*, *Organisational*

Encouragement makes no significant contribution to overall *Creativity,* suggesting that such individuals are independent creators. This is reinforced through the significance of *Organisational Encouragement* to the other independent quantitative outcome measures of individual and group idea generation and implementation and the apparent anomaly presented between ANOVAs and the lack of significance of post hoc tests? This is similar to previous research employing different measures that suggests cognitive innovators based on Adaption-Innovation (Kirton 1976), are independent creators while adaptors need support (Tierney, Farmer et al. 1999).

Models 3 and 4 might be interpreted as emphasising the relative contributions of personality and climate factors to creativity for those high or very high on *Openness.* On this basis, the personality dimension of *Openness to Experience* is suggested as a moderating variable rather than as a covariant.

5.1.6.1 Model Fit

Cases where Model 4 provides the best fit are Company 2 that is mid-range on *Creativity* and Company 6 that is low, and where high proportions of respondents in both are high or very high on *Openness to experience*. Model 4 suggests *Work Group Support* and *Challenging Work* contribute almost 60 percent variance between companies for those in the high or very-high bands. In both cases these are the only KEYS scales for which significant relationships are evident with creativity yet their relative positioning is deemed a result of the multiplicative interaction of dimensions. The main difference between these companies is in *Workload Pressure* where Company 6 is perceived as an excessively pressurised environment, although there is some evidence that time is also problematic in Company 2. As a small owner-managed company the need for creativity is likely to have become institutionalised over the ten years' of Company 6's existence and the expectation appears not to be actively stimulated to sustain a supportive climate. In contrast, Company 2 was

two-years' into the process of cultural transformation following a change in the senior management, which is not reflected in associates perceptions.

5.1.7 Workload Pressure

While a significant relationship has been demonstrated in this investigation for *Workload Pressure* with individual and group idea generation and implementation, this factor appears not to contribute significantly to any of the general linear models for *Creativity*. In common with the current investigation others (Ensor, Pirrie et al. 2006) have found an anomaly between perceptions of (lack of) *Workload Pressure* and *Creativity.* As a Tier 3 obstacle scale indicating extreme time pressures, unrealistic expectations for *Productivity* and distractions from creative work, *(lack of) Workload Pressure* represents what has been suggested as one of the least strong differentiators between high and low creative environments. However, it is perhaps also the most contentious of the KEYS scales (Amabile, Mueller et al. 2002). It is suggested here that *Workload Pressure* is most certainly a highly complex phenomenon for which alternative explanations might be possible. Indeed *Challenging Work* and *Workload Pressure* scales were identified from paradoxical influences where extreme time or *Workload Pressure*s could undermine creativity while pressure arising from the 'urgent, intellectually challenging nature of the problem itself' could positively influence creativity through intrinsic motivation (Amabile, Coon et al. 1996). Therefore, a degree of time pressure perceived as necessary to the urgency of an important project is likely to add to the challenge and intrinsic motivation. However, based on Amabile's componential model excessive time pressure might present a barrier to creativity by directly affecting cognitive processing or indirectly through motivation.

Creative thinking depends on the exploration of a maze of available cognitive pathways (Newell, Shaw et al. 1962) and although a straight path might lead to satisfactory outcomes using a familiar task algorithm,

creative outcomes call for exploration of the maze of possibilities. It has been suggested that the more time that is made available for creative thinking the more variations can be generated (Simonton 2003). Indeed many creative problem-solving techniques are structured to encourage exploration of the maze of possibilities from information stored in our brains through education, experience and *Openness*. Practice reinforces such techniques until they become part of our repertoire of skills. However, excessive time pressure is likely to prevent the exploration of alternatives or remote associations that have been demonstrated to correlate with creative outcomes in laboratory settings (Parnes 1961; Conti, Coon et al. 1993; Ruscio, Whitney et al. 1995; Whitney, Ruscio et al. 1995). Excessive time pressure is also likely to prevent time for other stages of the creativity process such as understanding the problem, *preparation* prior to engaging in idea generation and, of course, the *incubation* stage of the creative process (e.g. Poincaré 1913; Wallas 1926). Further, time pressure has been linked with 'hyper vigilance'(Janis 1982), excessive sensitivity to threats, and increased selectivity that increase the likelihood of reliance on familiar algorithms (Andrews and Smith 1996). Reliance on familiar algorithms is also suggested as more likely when intrinsic motivation is low. 'To produce truly creative – novel *and* useful – outcomes, people need time to cycle through the various creative cognitive processes repeatedly' (Amabile, Mueller et al. 2002:15). Cognitive processing is therefore useful in attempting to explain the association of *Challenging Work* and (lack of) *Workload Pressure* to individual and group idea generation and implementation outcomes and also provides a potential explanation for the lack of association of this obstacle scale with the *Creativity* criterion, representative of a supportive creative climate for creativity.

The effects of time and work pressures on cognitive processing and intrinsic motivation have been discussed above in respect of their relationship to individual and group idea generation and implementation. However, there is evidence that points to a direct negative relationship

between time pressure and creative cognitive processing that underlies creative outcomes. For example, a longitudinal field study investigated time pressure and creativity using daily electronic questionnaires. Results suggested that time pressure on a given day negatively predicted creative cognitive processing in the short and long term, 'that day, one day later, two days later and over longer time periods' and that this was not mediated by intrinsic motivation (Amabile, Mueller et al. 2002), leading these authors to suggest:

> "Managers who believe that frenetic activity is the hallmark of innovation may be making a serious mistake. Not only may it lead to burn-out and hampered progress in the long run but it may also kill creativity in the short run" (ibid:19)

Individual differences in perceptions of time pressure or preferred levels of pressure might moderate the relationship to creativity. A curvilinear relationship is also possible between time pressure and creativity, which was the focus of a further study that also investigated the possibility of *Openness to experience* and support from supervisors and co-workers as moderators. The results of this study suggested for those high on *Openness to experience* an inverted U-shaped relationship between time pressure and creativity in a supportive environment. For those less open to experience or in a less supportive environment increased time pressure had little effect on creativity (Baer and Oldham 2006:968). This investigation differentiated *creative* time pressures as opposed to overall time pressures in a similar way to that proposed by others (e.g. Isaksen 2007b). Creativity was measured using supervisor ratings and support was based on the extent to which supervisors and co-workers encourage employees to develop and refine creative ideas along the lines of previous studies (Madjar, Oldham et al. 2002). Conceptually, these authors are supportive of the systemic approach of the current investigation:

> "...our results indicated that both *Openness to experience* and support for creativity had only weak, direct relations to employee creativity but served to jointly interact with a contextual condition – creative time pressure – to multiplicatively affect such creativity. Our results, along with those obtained in earlier investigations emphasise the importance of considering the interactive effects of contextual, social and personality variables when examining creativity at work...our study was the first to address how these characteristics fit together to shape creativity at work." (Baer and Oldham 2006:969)

Although from a different focus and employing different methodologies and measures that prevent direct comparison there are some similarities with the suggested relationship of *Workload Pressure* to *Creativity* for companies participating in this investigation, as suggested by the case comparisons? *Workload Pressure* appears significant in the current investigation to individual and group idea generation and implementation and to the overall models, if not statistically. However, as a systemic investigation of the interactionist models *Workload Pressure* represented one of many factors explored which perhaps makes such similarities even more striking. A recent study employing respondents from healthcare organisations suggests that climate for innovation may reduce negative consequences of a demanding work environment (King, deChermont et al. 2007). However, unlike the current investigation neither this nor Baer and Oldham's study focussed exclusively on knowledge workers.

Quotations from interviews in this investigation reinforce important aspects of this dimension:

> "It's not that the business doesn't rate creativity highly or give it high priority ... we operate at about 150 mph all the time and, therefore, key individuals that are responsible for driving the creativity ... the owners of the clients, the projects, that get a brief from a client and need to get the business being creative ... don't do it.. I would say

> from the associates perspective it's important to them and they know the client demands it but what they're not doing is prioritising it to give them time to be creative. They're just expecting it to happen! (Company 2 Interviewee 2:16)

> "We have a very short business cycle ... the time span of discretion here is about 4 hours ...and that's quite inhibiting to creativity" (Company 3 interviewee 1:96).

Both of these companies allied to the traditionally creative worlds of advertising and marketing. For Company 2, *(Lack of) Workload Pressure* is mid-range as is *Creativity,* ranked third of the eight companies (Table 47) and more than half of associates, high or very high on *Openness*. For Company 3, *(Lack of) Workload Pressure* is very-high while *Creativity* is very-low, ranked least supportive of creativity among participating companies and with less than one-third of staff high on *Openness*. Excessive and unrealistic time and workload demands are likely to kill creativity, while a complete absence of such demands appears to have a similar effect. This is supportive of the Baer and Oldham's (2006:968) suggestion of a curvilinear relationship for workload pressure and of an inverted U-shaped relationship between time pressure and creativity in a supportive environment for those high on *Openness to Experience*. *Workload Pressure* failed to contribute to *Creativity* in any of the models resulting from this investigation. However, this represents an important area for future research.

5.2 **Qualitative Outcomes**

Through the development of the general linear models it was not originally anticipated that retrospective analysis of cases would so clearly illustrate confirmatory examples. Particularly models 2-4 that explore *Openness to experience* bands as all companies comprise individuals across all bands. Yet these models are substantiated independently and by company. This

adds to the significance of the models providing clear examples that also highlight important qualitative characteristics and deviations might moderate or mediate quantitative models in attempting to explain remaining variance between companies over and above that explained by the general linear models in respect of climate for creativity and the *Openness to experience* dimension of personality.

5.2.1 Climate for *Creativity*/Creative Requirement

Qualitative data has highlighted distinguishing characteristics between companies analysed in Chapter 4 and discussed above in relation to the general linear models developed from quantitative analysis. Some distinguishing characteristics overlap with factors that form part of the quantitative assessment of creative climate but are qualitatively different, which demonstrates both the value and limitations of quantitative data analysis derived from the KEYS assessment of creative climate. However, it is suggested that all add value to the quantitative models and extend the variance explained in a way that is useful to organisations aspiring towards creativity and with which they might meaningfully engage to gain direction on their journey to transformation.

Assuming shared meaning among management and employees how might the expectation of creativity be realised in practice? How might staff be effectively stimulated and supported in applying creativity at the level of individual or group tasks? And, how is this sustainable for the benefit of the organisation? Can it be assumed that staff will want to be creative and that they have the necessary skills and know how? As suggested in Chapter 2 the value of the componential approaches is the emphasis on the multiplicative interaction of individual, social and organisational factors. Amabile's major contribution in particular has and continues to be the motivational affects of stimulants and obstacles of the climate for creativity and innovation at the level of the individual, the work group, management and organisational procedures. Quantitative analysis of climate for creativity based on the KEYS assessment of creative climate has formed a

major part of the analysis resulting in an overall general linear model and the suggestion of a possible moderating or mediating effect of *Openness to experience* and *Workload Pressure*, as discussed.

Quotations extracted from interviews highlight critical issues in facilitating organisational creativity, which most readers are likely to relate to as are companies aspiring, perhaps less successfully, towards creativity.

5.2.1.1 *Love for one's work*

Love for one's work (Csikszentmihalyi 1996; Amabile 1997) has been cited by influential contributors as important to creativity. Between 30 and 60 percent of respondents in the more successfully creative companies participating in this investigation reported 'fun' as important to what it means to be creative and innovative. Indeed this question was added subsequent to the pilot with Company 1 due to the implied importance. The following quotations clearly indicate such the significance of such emotions, some of which somewhat ironically fly in the face of concepts such as emotional intelligence:

> "When we were first here [immediately following downsizing] there was a huge push on 'let's bring in new ideas'; it was very exciting, very dynamic ... it was the most fun that it's been here really ... There was a honeymoon year. We were here to identify excellent technology across Europe.... Wow! What a fun job ... let's go find it" (Company 4 Interviewee 2:49)

> "Person-centred planning ... I'm very passionate about that ... I'm Mrs PCP! It's not a new concept, it's been around for years, basically ... in the past we've devised care around what we think they need rather than asking them how they would like it to be – empowering them ... encouraging them to make some of the decisions. I've supported a lady for 8 years ... she's mad on dolphins ... control of her own life ... ultimate dream to swim with dolphins ... After a lot of work and

research, she went to swim with the dolphins in Florida. But it took her those 8 years to be able to say that and get something happening. She has mobility and anxiety problems, cannot self-medicate – we applied for funding and succeeded." (Company 8 interviewee 2:46)

"I know it makes a difference to people's lives and if I wasn't passionate about driving it then it might not have happened. And, as a manager, my staff can see the passion and enthusiasm ...." (Company 8 interviewee 2:78)

5.2.1.2 *Understanding and Risk implications*

An important part of the rationale for this investigation was the suggestion of influential contributors (e.g. Storey 2000) of a lack of understanding among managers in what it means to be creative and innovative in practice. As would be expected given the subjectivity of the concepts and processes of creativity, most companies demonstrated some degree of deviation or confusion. One of the most common barriers experienced in recruiting companies for participation in this investigation was the misunderstanding of creativity purely in aesthetic terms. This is illustrated in one participating company that had to overcome the misfortune of communicating creative requirement across the entire organisation while the design department bears the label:

"One of the things we suffer from here is that we have a Creative department – it's a design studio, it's not a creative department, it's a design studio – but the associates view is that creativity belongs there... some people, not all." (Company 2 Interviewee 2:48)

Another overlaps with the love or passion emphasised above while emphasising the importance of shared values and meaning in contributing to overall objectives:

> "Creativity, for me ... I think the areas we've looked at ...PCP ... how that would improve the life of service users and meeting their needs ... I also think the other one is the away days for the staff teams that I've introduced over the last year. I think it's all about getting them to see the mission and the values. Some of the teams have been together for so long and it's about reigniting passions and beliefs" (Company 8 interviewee 1:46)

Interesting and informative insights emerged from a number of participating companies. For example, in response to the question of perceived distinction between creativity and innovation:

> "Of course, there's a difference, because they are not the same thing. Creativity is really results of individual education and skill, inherent or not in the person's intellect and brain, and their interaction with the work environment. Whereas innovation is the result to solve a particular problem, which is, incidentally, how we make a living. I ought to say by the way that in some aspects innovation is not allowed. Because if you're designing a section of the wing for the Airbus A350, the regulators and ultimately the passengers are not going to thank you for innovating on their flight .." (Company 5 interviewee:38)

This quotation raises the inherent problem of risks associated with creativity and innovation. Similar concerns are raised by others, in a totally different business sector. Interestingly, the essence of the business for both companies depends on creativity and innovation, yet:

> "... some experience of managing to support creativity and innovation in an environment where it's OK to be wrong and to take risks ... boundaries necessary (i.e. cannot be overly 'creative') if the message is to be communicated effectively – i.e. creative design and creative journalism" (Company 6 Interviewee 1:12)

> "... it's not that kind of buzzy, studio atmosphere you get in a lot of places .. so it's quite a challenge really (26). We're so niche we have a philosophy about design and the way we set a page out ... it's all about readability ... basically if we design something and it doesn't get read then it's not doing its job ... so we try to up the standard and be creative within the constraints" (Company 6 interviewee 2:98)

Further interesting and important insights are to be gained from a company that is demonstrated as perhaps the least successfully creative and innovative of participating companies:

> "... there's kind of a neurolinguistic thing – I've been saying for 16 years this is not a creative company, and it can create a self-fulfilling prophecy. Other people will say this is not a creative company. But if we say this is a company where I hope we encourage people to try and find a better way (I sound like a Nat West advert!) .. I think we do that a lot... but I never applied the label 'creativity' to that" (Company 3 interviewee 1:90)

Initial discussions with this company suggested it was not at all creative while the suggestion of the MD reflected the realisation that perhaps it ought to be. Clearly, the initial telephone conversation had lead to reflection on basic assumptions and practices. Within the same company another interviewee suggests:

> "Because, I don't think people think about it. They don't actually ... when they're having to do their work, think about whether this is creative or not, it is just part of what they do. So, it's not in their minds, so therefore, it's not a priority because it's just natural (laughs). So, yes, if it's difficult, something different, totally different then it is a high priority because you really need to think about it and how you're going to solve it. But on a more daily basis, when things

> are more normal, you are being creative for your client, but it's not that you're thinking about it." (Company 3 interviewee 2:38)

Other quotations emerging from the interview with the MD of this company suggest a good understanding of creativity and innovation in practise and which adds further weight to the suggestion of

> "One of our mentors uses an expression that has transferred to company folklore, which is ... thinking right around the cup ... so trying to remember that what I'm looking at there might look completely different from a different perspective and I might find a handle that allows me to pick it up more easily. So that's what it means to me. Yes so, integration, communication, problem-solving, thinking outside the box and remembering all the terribly proven adages about if you plan your exam paper properly you will get to the end of the exam whereas if you just dive in at question 1 you will screw up by question 3. So time spent in reconnaissance is never wasted ... think about it before you start and you'll probably be able to do it more quickly" (Company 3 interviewee 1:150)

5.2.1.3 *Shared Meaning*

To this point understanding of the concepts and processes of creativity has been limited to individual quotations extracted from interviews with key informants. Yet translation of corporate objectives to performance is dependent on communication of meaning and shared perceptions between all levels and functions of the organisation, in far greater breadth and depth than is measured quantitatively through KEYS. The existence of what has been referred to as the 'Big Idea', a clear mission underpinned by values and a culture that communicates what the organisation stands for and is trying to achieve, is critical to the link between human resource policies and practices and performance (Purcell, Kinnie et al. 2003; Boxall and Purcell 2008). In suggesting that performance results from knowledge, skills, motivation and opportunity to use these skills in the job and in contributing to the success of their work groups and the organisation, the

Ability, Motivation, Opportunity framework clearly overlaps with Amabile's (1996) componential model. In Amabile's model, skills and abilities interact with intrinsic motivation and the work environment to determine creative and innovative behaviours. Therefore, while the value of Amabile's approach is the focus on intrinsic motivation through a climate that stimulates and supports creativity, the value of Purcell et al's approach is the emphasis on the need for integration and alignment of human resource policies and practices, vertically and horizontally. This is critical to the above discussion of the need for shared meaning, understanding and common frames of reference among management and other staff members such that all have direction and understand the clear-cut business need for creativity as well as the significance of their own role to the 'Big Idea'.

For management, meaning is determined by an interaction of the dynamic external environment with organisational culture, vision and strategy that leads to a perceived need to adapt based on intrapersonal beliefs, values and assumptions. The first key question therefore is whether the organisation actively aspires towards creativity? In the absence of active aspiration creativity is unlikely as is evident in the extreme case of Company 3. Active aspiration requires far more than an awareness of a universal twenty-first century rhetorical need and a few random brainstorming sessions if it is to be achieved in practice.

How central, critical and important is creativity to the business? For example, are these processes at the very heart of the business, the very essence of the company's mission and strategy as is suggested by Companies 1, 2, 4, 5, and 6 regardless of how successfully this is realised in practice. Or, is creativity peripheral to mission and strategy as suggested by Company 3, or somewhere in between these extremes, as with companies 7 and 8. Direction is essential. For example, in what way(s) does the company aspire to be creative and innovative and how is this likely to be of benefit? Is it about clients paying for creative and

innovative solutions, services and new products, or is it about better ways of managing, organising, improving services or improving the lives of others, or all of these? Where creativity is at the heart of the organisation it becomes part of what the company is rather than processes to be applied as demanded solely to client solutions and services. Closely related to this is, of course, a sound and shared understanding of the concepts and processes of creativity if these are to be effectively translated into policy and practice. Central to this discussion is Storey's (2000) suggestion of extensive differences between managers in the same company about the actual meaning of the injunction to be innovative leading to problems in successful exploitation of new ideas through having to overcome competing expectations, strategies and rationales. Creativity and innovation represent frequently discussed phenomena. Yet are there common frames of reference? As is apparent from the interviews undertaken for the current investigation many managers fail to appropriately differentiate between the terms 'creativity' and 'innovation' frequently using these interchangeably. Of interest here is the observation that the most appropriate definitions and understanding were proposed by managers and staff in Companies 1 and 4, precisely those that appear most supportive.

> "So for a lot of people that we've recruited in the two years, they've come to expect that they can say or do anything and they will not be shot down because of it, we thrive on it. But some of the original older school people are still coming to terms with this ..." (Company 2 Interviewee 1:424)

> "... what I want is for people to take personal responsibility and to come forward with new ideas ... either on how we can change and develop the business or on how we can change and develop what we offer to a particular client" (Company 7 interviewee:53)

Of course, where there is a lack of shared understanding and meaning among managers this presents additional problems in communicating clear and coherent aspirations to the workforce where the degree of understanding and meaning are likely to be somewhat lesser still. Lack of shared meaning among staff is suggested for the majority of companies participating in this investigation to a greater or lesser extent, even for those more successfully supportive of creativity. Shared meaning is of course, central to organisational culture and climate and the notion of creative requirement should represent a direct or indirect influence in communicating common goals, or the zeitgeist, of a shared community. Expectation of the generation of creative ideas and creativity goals represent important components in creative behaviour that has been suggested to fully mediate the effects of supportive leadership, role requirements and, to a lesser extent, empowerment and time demands (Shalley, Gilson et al. 2000; Unsworth, Wall et al. 2002). The two main studies that have investigated creative requirement, to date, have not attempted to relate this to the broader organisational orientation for creativity or to psychological and organisational climate in this way. The need to manage culture to adapt to changing circumstances was outlined in Chapter 2 and aspiration towards creativity demands culture and climate change, of which shared meaning is an important part. The pervasiveness of organisational culture will facilitate or constrain change and, therefore, cultural change is necessary for organisational change to be effective. While it is unrealistic to expect a single culture within an organisation creative requirement is an important element of developing a climate where staff perceive that creativity is expected and one that supports such expectations. Employees are likely to need supporting in understanding the potential for creativity in most jobs and roles at all levels and across all functions? Can it be assumed that all understand how to be creative and innovative?

Institutionalisation (e.g. Giddens 1979) is most frequently discussed from the perspective of routines and inertia of organisational or societal

environments which nurture established patterns of thinking that reject or inhibit creativity, innovation and change (Kanter 1988; Ford 1996). It is useful to consider such suggestions from various perspectives. For example, that habit (Ford 1996) will be favoured over creative behaviour again overlaps with automatic cognitive processing and reliance on familiar algorithms discussed earlier. Creative thinking demands greater attention to cognitive processes largely due to a lack of practice and reinforcement based on past educational, vocational and general life experiences where for most, other than those in the traditionally creative industries, creativity has not been encouraged. In the twenty-first century it is perhaps alarming that may people still perceive creativity as aesthetics applicable mainly to those in the traditionally creative industries, such as design.

However, it is suggested that the analysis of participating companies introduces important additional dimensions to our understanding of institutionalisation. For example, it would be expected that creativity is institutionalised in research and development organisations and those whose business is closely allied to advertising and marketing, among others. Yet, both research and development companies (Companies 1 and 4), one of which was in the process of transformation from what was an oppressive culture while the other had relatively recently undergone harsh downsizing, appeared to be actively making efforts to stimulate, support and sustain creative energies. Company 2, very closely allied to advertising and marketing and, therefore, where there would be an expectation of the institutionalisation of creativity, was similarly in the process of transformation from an oppressive culture and actively taking steps aimed at stimulation, support and sustainability of these processes. In Company 6 there appears to be much less support regardless of the expectation of stimulating and sustaining creative energies. Company 3 has already been noted for its lack of active stimulation, support and sustainability. The most significant example of insight into institutionalisation would appear to be Company 5, where the innovation is

critical to the business yet where climate for creativity appears not to support such claims. The implications of this example are important on the basis of the need to actively take steps to continuously stimulate and support a climate of creativity so that they are sustainable long-term. Aspiration and expectation of creativity, whether institutionalised, in the process of transformation or a relatively recent initiative all demand active stimulation and support if such initiatives are to be sustained. Evidence arising from qualitative analysis highlights additional factors suggested to have an enormous positive effect in stimulating, supporting and sustaining organisational creativity in addition to those that are currently perceived as a supportive climate.

5.2.1.4 *Freedom to voice ideas*

A significant and recurring finding among those companies that actively attempt to stimulate and support creativity, whether currently successful or in the process of cultural transformation, is the reporting of employees that they feel free to voice their ideas without fear of intimidation or humiliation and that their ideas will be listened to. Some items of the KEYS survey do tap into this (e.g. fair evaluation) although perhaps lacking depth and breadth and at a rather superficial level. Evaluation and fear of evaluation (e.g. see Egan 2005) are important to creativity from a number of perspectives. For example, many individuals fail to contribute ideas to a discussion or idea generation session for fear of appearing stupid, being ridiculed or intimidated yet these individuals have potential to make important contributions that are potentially highly valuable to the company. Indeed the historical portrayal of the lone genius implies introversion that would increase fear of evaluation. This raises questions of the extent to which individuals perceive such *Freedom* exists that is truly without such fears. Secondly, postponement of evaluation is an important part of creative idea generation that is difficult to achieve in practice and reduces the effectiveness of the majority of so called 'brainstorming' sessions. Therefore, this represents a critical aspect of supportive climate and one that demands serious consideration by companies that aspire towards

creativity. In group idea generation and discussion, does the necessary absence of hierarchy and climate exist such that all employees feel free to voice their ideas without immediate or subsequent, direct or indirect fear of intimidation or humiliation? Can companies honestly say that all ideas are listened to regardless of employee status or do power and influence preside over which ideas are taken forward?

Interview quotations that reinforce the significance of *Freedom* of voice include:

> " ...he was just like a breath of fresh air, basically. He is just **so** enthusiastic and so positive. ...After you've been hammered for 5 years, then you realise that you are free to say anything to him and he'd listen to what you say. Gradually everyone has come out of their shell again and … for the past 2 years it has *really* changed. … We want to become more empowered, entrepreneurial ... in 2 years we have seen *major* change ... The creative side is being open to anything and to be able to suggest anything without being laughed at …It's a good way of surfacing issues that might not otherwise be conscious thought" (Company 1 Interviewee 2:43)

> "...in previous sessions it's almost like a competition for who can say the most scientific ... cleverest ... technical ... thing ...I think scientists can be incredibly competitive like that ... and also I used to feel incredibly intimidated to say anything because I'd feel like it was a stupid thing to say .. whereas I shouldn't feel like that ...it's always the noisiest people who are the most technically competent that speak up ... so that's one of the things we're trying to bring in ....I think I'm trying to create a culture where they can have fun! It is OK to be wrong ... it is Ok to say something completely and utterly stupid ... ideally in a year's time I'd like to see that kind of culture the whole way through... But it's hard work!" (Company 4 Interviewee 2:109)

> ".. we strive for a culture that is, as far as possible, blame free, people get told when they are recruited that it they don't make mistakes it means you are not trying hard enough" (Company 3 interviewee 1:183)

> "People get listened to... generally I say fantastic ... if they are happy to drive it themselves then I leave them to do it ... For example the laminated motivational posters in reception ...and instead of the Financial Times there are 2 Dilbert joke books in reception" (Company 7 interviewee:128)

5.2.1.5 *Mechanisms for developing and implementing new ideas*

Again, while KEYS taps into mechanisms for generating and implementing ideas there is no specification of what form such mechanisms might take. Such factors formed a substantial proportion of inhibiting factors and suggestions for improving the climate for creativity. Again, among those companies that appear to be most actively encouraging creativity several mechanisms were in place aimed at stimulation and sustainability. Key to such mechanisms is a creativity champion or champions, individuals that are committed to stimulating and supporting such processes in the organisation. Creativity champions have or are prepared to develop skills in creative problem solving techniques and to undertake to share and develop these with and in others through group staff development activities. Training in creative problem solving techniques for such champions might come from attendance at networking groups (e.g. Ideas Clubs) or through a commercial provider. However, it is critical that such training is regular and ongoing rather than ad hoc as appears commonplace among participating organisations. Ongoing, regular practice in such techniques leads to institutionalisation and sustainability. This might be achieved through other important mechanisms such as internal creativity and innovation clubs that meet regularly and to which employees are encouraged to bring actual problems. An integral part of these clubs is practice in the application of creative problem solving

techniques such that these eventually become part of employees' repertoire of skills and the development of company procedures to manage the wealth of ideas generated, both essential to future application and sustainability of organisational creativity. Linked to such mechanisms is, of course, the association of creativity to 'fun'. However, the importance of such mechanisms is that they are regular, ongoing, eventually institutionalised and, therefore, sustainable.

Mechanisms are unlikely to make a difference in an unsupportive organisational system and some (Csikszentmihalyi 1996:31) suggest that climate is of greater significance. As discussed in relation to training in creative problem solving techniques, the amount of training, motivation and grade were all significantly associated with generation of ideas. However, implementation of ideas appeared not to be associated with creativity training (Birdi 2003). Environmental factors of management support and divisional climate were much more strongly related to implementation and suggest that whilst creativity training may enhance the generation of ideas, if the work environment is not supportive then few of these ideas will be transferred into organisational innovations. In Sternberg's investment model creativity in any domain are dependent on motivation. It is further suggested that creativity may not only require motivation but also generate it (Amabile 1996; Birdi 2003), something that is important to Amabile's (1996) revisions to her original (Amabile 1983) model, which excluded social environmental influences and the potential of motivational synergy (Amabile 1993) of some types of extrinsic motivation with intrinsic motivation. Intrinsic motivation, therefore, is central to sustainable creative and innovative behaviour and the continued contribution of these processes to developing and maintaining competitive advantage.

> "So, for example, if the quality manager has a problem and wants to do something about it he'll bring the idea to the club and we'll go through the process of generating creative ideas using creative

> problem solving techniques. We've got a whole raft of those that we use. Then the problem owner will then take 1, 2 or maybe 3 novel or useful ideas away from the creativity club to then go and implement. More strategically, what we also do, as a Board of Directors, is to identify areas around which we want to be more creative and innovative. We will construct problems that we want to take to the creativity club that are merely representations of our strategic issues and, again, we use the creativity club as a mechanism to crack those open. The club is the structured mechanism that we use for generating and implementing ideas." (Company 1 Interviewee 1:26)

Importance of formalising mechanisms .....

> "We don't have formal mechanisms for dragging that out of people but we do support people. I know what you mean, to be creative and innovative. ... It's done in a very informal way. ...We provide a work environment that encourages people to be creative ... informally through working relationships, trust and the expectation of innovation. ... We hear a lot in HR don't we about why people come to work. ... Here a large part of that comes from the satisfaction and enjoyment, a large part of which is the ability to innovate and solve problems. ..Part of what drives creativity is their ability to solve quite difficult problems ... an expectation to innovate" (Company 5 interviewee:70)

> "When we were first here [immediately following downsizing] there was a huge push on 'let's bring in new ideas'; it was very exciting, very dynamic ... it was the most fun that it's been here really ... There was a honeymoon year. We were here to identify excellent technology across Europe.... Wow! What a fun job ... let's go find it" (Company 4 Interviewee 2:49)

Creative Problem Solving techniques, of course, represent one of the more familiar and popular mechanisms claimed as supportive of creativity.

Such techniques do not specifically form a part of the KEYS assessment of creative climate and, unfortunately are all too frequently exploited by less than reputable providers for purely commercial gain. Evidence is emerging of positive effects of robust approaches to creativity training (Balestra 1997; Puccio, Firestien et al. 2006). Interviews conducted with several of the participating companies highlighted the awareness and perceived significance of CPS skills:

> "Technical challenges ... for example, non-linear behaviour of complex structures ... to solve the problems associated with complex structures... these are naturally intelligent, creative people. What they need are the skill enhancements and techniques to solve complex, difficult, problems ...part of staff and business development ... If we were to fall behind then we would not be entitled to the strap line that we have" (Company 5 interviewee:91)

Others demonstrate a lack of awareness of such techniques and their potential value. For example, response to the question of whether staff had training in creative problem solving provides insight into individual perceptions inasmuch as this indicates a lack of open communication in the company and misunderstandings of the nature of CPS training.

> "No, that's interesting. I've never thought about having a meeting that's actually about creativity ... you can't force creativity... all you can have is an environment that's supportive" (Company 7 interviewee:216)

A designer, herself highly creative, offered a very different response, which demonstrates a lack of awareness of CPS training while immediately recognising the very practical implications in managing people to stimulate creativity and innovation:

> "I think that things like that [CPS training] would be great here ... just having fun...with a purpose. From my own perspective, I'd love to learn about things like that ... because I have to try to get that out of my staff ... but I need some guidance sometimes" (Company 6 interviewee 2:249)

Commercial approaches typically involve a single training session in one or two techniques in return for payment of a fee more representative of the provider's profiteering than any sustainable skill development of participants. Regular opportunity to practise such techniques in a supportive climate allows the company to stimulate, support and sustain creativity, as suggested:

> ... We only did the first of our creativity sessions about 10 months ago and we've done it 3-4 times since. It's not embedded," (Company 2 Interviewee 2:373)

5.3 **Strategic Human Resource Management and Development**

The implications that effective management of creativity demands consideration at the level of the individual, the group, the organisation and the strategic environment (Mumford 2000:314) mirror precisely the focus of human resource applications. It has been suggested that human resources policies represent one of the more visible and directly manageable aspects of organisational structure and culture and as a result may have significant impact on creativity (Arad, Hanson et al. 1997). A major part of this thesis has been the assessment of climate for creativity based on respondents' perceptions resulting from a clearly defined and shared mission that is underpinned by values and a culture that communicates what the organisation stands for and is trying to achieve and that is reinforced through respondents' perceptions of a supportive organisational climate. Strategy, structure and culture of the organisation are of course largely determined by senior management and

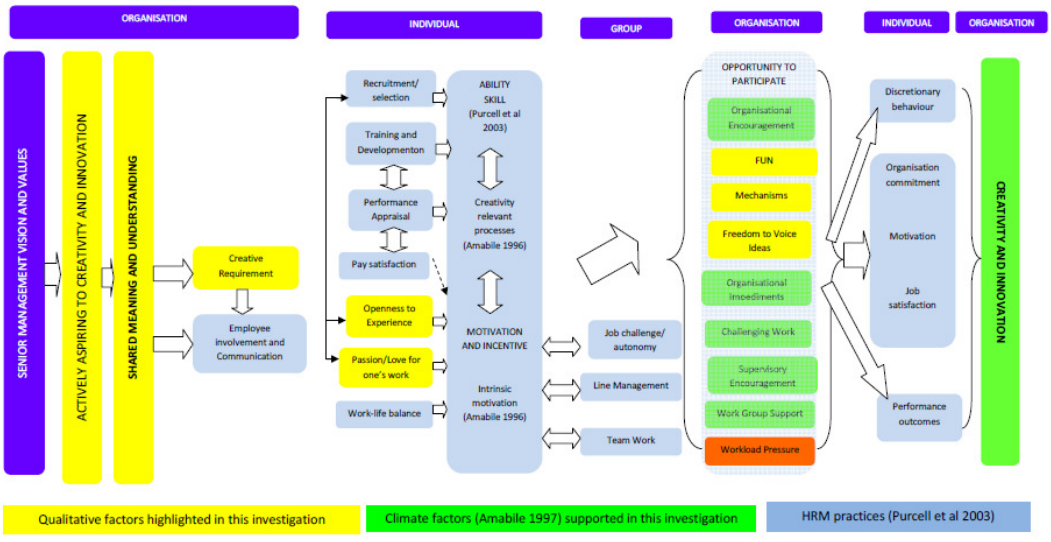
directly influence climate as is evident from the KEYS assessment of climate for creativity, the main quantitative outcome measure of this investigation. This discussion highlights the need for integration of organisational culture and psychological climate with human resource practices to stimulate and support creativity in line with an organisation's mission and values. Organisational cultures that stress the value of innovation, autonomy, human resources and collaboration appear more likely to produce innovative products (Arad, Hanson et al. 1997; Mumford and Simonton 1997) and cultural values are likely to attract talented creative people (Mumford 2000).

For example, the majority of items in the *Organisational Encouragement* and *Organisational Impediments* scales relate to stimulants and obstacles respectively in relation to organisational motivation, while *Challenging Work, Work Group Support* and *Supervisory Encouragement* are all stimulant scales relating to management practices (Amabile 1997). These are the five scales suggested to be most important to stimulating and supporting creativity, four of which together with the personality dimension of *Openness to experience* have been suggested as contributing almost 47 percent variance between participating companies. While somewhat of an anomaly, *Workload Pressure* was also suggested as significant. Clearly managers have control over time pressures and climate to a greater extent than other factors, for example, personality dimensions and organisational politics. Qualitative analysis adds significant value to the findings of this investigation in demonstrating support for the quantitative models while highlighting limitations of the KEYS assessment of creative climate. Suggestions are made specifically in relation to the focus on managing organisational creativity that is sustainable, assuming a resource-based view of HRM (Barney 1991) and structured broadly around the framework of Purcell et al (2003) that links people and performance through 11 key HR policies and practices, as illustrated in Figure 2-5. The intention is to extend the findings of this investigation to explore some of the implications for HRM policies and practices in stimulating, supporting and sustaining

organisational creativity. Most of the factors investigated overlap with a number of HRM policies and practices and it is important that this section is considered around the broader and more in-depth overall investigation.

Figure 5-36 illustrates factors highlighted in this investigation as facilitating organisational creativity building on a foundation that synthesises Amabile's (1996) KEYS dimensions of supportive climate for creativity and Purcell et al's (2003) People and Performance model of HRM. The complexity of interactions necessitates that arrows relate specifically to factors demonstrated as facilitating creativity as indicated in Model 1 (Table 32) and extended to include qualitative factors. The apparent insignificance of *Supervisory Encouragement* in the general linear Model 1 is likely to be due to the sample comprising SMEs, and this is retained in the figure. This can be adapted to demonstrate the contribution of different factors dependent on degree of Openness to experience, as suggested by alternative general linear Models 2-4 (Tables 38-40).

Figure 5-36 Model illustrating factors facilitating organisational creativity



This illustrates contributions and interactions of factors at the level of the organisation, the individual and the group, starting with an emphasis on the vision and values of senior management and the need for active aspiration towards creativity and innovation. The necessity of shared meaning and understanding demonstrates the criticality of creative

requirement and effective employee involvement and communication practices for the entire workforce collectively.

At the level of the individual, this highlights the need for a consideration of the personality dimension *Openness* and a passion or love for one's work in enhancing creativity as part of recruitment and selection, the critical first stage in the development of the employment relationship. These factors are significant to ability, skills and creativity relevant processes and to intrinsic motivation that underpins Amabile's (1997) model. This also highlights the focus throughout this study that group and organisational factors can so easily destroy individual ability and motivation for creativity. Job challenge and autonomy, line management and team work of Purcell et al's (2003) model overlap directly with Amabile's *Challenging Work*, *Supervisory Encouragement* and *Work Group Support*, respectively. All of Amabile's (1997) dimensions supported by this investigation fall into Purcell et al's (2003) Opportunity to Participate, together with additional factors arising from qualitative analysis, including fun, mechanisms for creativity and innovation and freedom to voice ideas. Figure 5-36 clearly illustrates how any of these might kill individual ability and intrinsic motivation to be creative and which have a direct effect on the discretionary behaviour, organisation commitment, job satisfaction and performance central to Purcell et al's people and performance model. Further implications arising from this investigation for HRM practices are considered below.

5.3.1.1 *Recruitment and Selection*

Effective recruitment and selection depends on a combination of the use of sophisticated selection techniques that have been demonstrated as reliable and valid, with more intuitive, judgemental approaches. Identification of required competences, expertise and experience specific to the role are also essential to both processes for the benefit of the organisation and potential applicants. As discussed earlier the significance of expertise to creativity is complex. While there is little dispute on the

necessity of expertise there appears to be a need to balance sufficient versus excessive expertise which might lead to an over reliance on the status quo and, therefore, provides some evidence for new perspectives from newer entrants to a field. Competence-based approaches further facilitate alignment between HRM practices. The significance of *Challenging Work* and *Work Group Support* to *Creativity* demonstrated in this investigation have important implications for selection criteria.

However, in relation to personality dimensions psychometric tests are increasingly common as a selection and development tool although, of course, training and accreditation are essential to best practice. Here, where the focus is on the additional requirement in selecting for potential to enhance creativity even greater discernment is necessary in identifying appropriate tools. For example, as discussed in the introduction to this investigation, Creativity tests have been criticised as trivial, inadequate measures of creativity (Sternberg 1986), most frequently assessing only divergent thinking and failing to capture the need for expertise and intrinsic motivation, or the value and usefulness of ideas. Generating as many abstract ideas as possible on demand at a single point in time and under time constrained conditions would seem to bear very little resemblance to stages of the creative process (e.g. Poincaré 1913; Wallas 1926) or to the actual demands for business creativity. The relationship of individual characteristics to creativity appears more advanced and the significance of the *Openness to experience* dimension of the five-factor model is supported in the current investigation. Individuals high on *Openness* are suggested as imaginative, intellectually curious, cultured, original, broad minded and artistically sensitive and while this represents a single dimension, Costa and McCrae (1985) emphasised different manifestations of this dimension depending on the focus of the experience as outlined in Chapter 2.

On balance, while evidence supports the significance of *Openness to experience* it is necessary to question whether it would be desirable for all

members of a team to score highly on *Openness*, or only a few (Shalley, Zhou et al. 2004a)? Of course, this also applies more widely to best practice recruitment and selection, which is frequently criticised for developing a relatively homogeneous workforce rather than aiming to achieve diversity that is important to stimulating, supporting and sustaining organisational creativity. This investigation also provides evidence of an association between *Openness to experience* and training in creative problem solving techniques. However, the nature of the relationship did not form part of this investigation. Two possible explanations are considered. Might individuals who are high on this personality dimension be more likely to participate in CPS training? Alternatively, might CPS training increase *Openness to experience, which has* implications for the relative stability of personality versus training effects. Also arising from this investigation is the suggestion that different levels of *Openness to experience* are most appropriately supported through different factors and that for individuals who are very high on this dimension of personality *Work Group Support* and *Challenging Work* are important while *Organisational Encouragement* appears relatively insignificant.

5.3.1.2 *Job Challenge*

Challenge is identified as significant in models of Human Resource Management in contributing to effective performance (e.g. Purcell, Kinnie et al. 2003) and as supporting creativity (e.g. Oldham and Cummings 1996). As a stimulant to creativity the significance of *Challenging Work,* the perception of working on important, meaningful, demanding tasks and projects that are valued by the organisation, has been discussed extensively throughout this thesis. Indeed this was the main factor contributing to creativity as suggested by the GLM as contributing almost 47 percent variance to *Creativity*. The significance of *Challenging Work* to this investigation has been demonstrated across both sets of outcomes (*Creativity*, and i*ndividual and group idea generation and implementation*) and across all models based on *Openness to experience* bandings. In a climate where creativity is valued, required and where creative work is

produced this in itself presents an intellectual challenge to individuals and groups in developing creative and innovative solutions that contribute to the aims of the company. Of course, challenge also indicates learning and development for the benefit of the individual, the group and the organisation.

From the perspective of HRM one way that work could be more challenging might be in assigning responsibility to an individual or group in relation to a project, task or client account, for example, starting with responsibility for a small project, perhaps, and building gradually in scale and demands. Allowing workers a choice of project that matches their interests and skills is useful. There is evidence to suggest that better creative performance is observed when people are assigned to projects consistent with their interests and work styles (Hammerschmidt 1996) and allowing people to self-select or bid for projects that are of interest may capitalise on skills and intrinsic motivation (Zuckerman, Porac et al. 1978). This might take the form of self-managed teams where an individual with the most relevant knowledge and/or expertise would lead. Competition among groups of confident skilled workers can enhance creativity (Cummings and Oldham 1997; Shalley and Oldham 1997).

5.3.1.3 *Reward and Recognition*

Reward systems comprise both intrinsic and extrinsic rewards. While extrinsic rewards such as salary might attract workers to the organisation it is unlikely they will remain motivational in the long-term and, therefore, intrinsic rewards and recognition are likely to be more motivational in stimulating, supporting and sustaining creativity longer term. Financial rewards are not precluded if, for example, these take the form of bonuses for achieving creative targets or incentives for creative work or for ongoing learning and knowledge development. Cafeteria reward systems are entirely suited to stimulating creativity as individuals are able to choose those most personally meaningful and valued. However, creativity processes frequently involve group work and it is important that any

reward system be designed to appropriately recognise individual and team contributions. Reward for creative work might well also take the form of career progression but it is important that all types of reward and recognition area made completely transparent to be as fair as is possible to all.

Stimulating creative idea generation, developing a supportive climate and embedding creativity in business organisations take time. It is strongly suggested that for organisations newly aspiring to be creative or innovative and are in the process of transformation or others needing to reignite inert aspirations and where stimulation and support have been recently initiated it is likely to be perceived far more fairly to reward efforts towards the processes rather than outcomes. So, for example, this might be rewarding creative skills development or facilitating sessions on an actual problem. An interesting and challenging exercise would be to set staff a task to use their creativity skills to design a reward system that would be meaningful, valued and intrinsically motivational in stimulating, supporting and sustaining such processes long-term in the organisation, department or work group.

5.3.1.4 *Work Group Support*

As would be expected team working is central to models of HRM such as that of Purcell, Kinnie et al (2003). Diversity of skills in a group is important to idea generation, sparking ideas in others, stimulating associational relationships and building on ideas generated. Collaborative performance objectives and targets (although with individual recognition) and cross-functional teams, for example, are both likely to provide the diversity of knowledge and skills necessary for creativity and to allow for greater integration between teams or departments. In addition, in a group some individuals may be better at generating ideas while others might be more effective in securing their implementation (Puccio, Treffinger et al. 1995).

While a transformational leader is likely to provide the necessary vision and inspiration the leader's role in creativity is likely to be facilitative and supportive. An absence of hierarchy or status in the group that facilitates a truly open climate where individuals feel the *Freedom* to contribute to a lively flow of ideas, where all ideas are valued where there is no intimidation, humiliation or a fear of appearing stupid. In a climate where creativity is called for, team members should feel that mistakes are acceptable providing the effort was made and that these are learned from.

Mechanisms that were suggested as distinguishing between more or less successfully creative companies participating in this investigation, such as creativity and innovation clubs, which will form an important qualitative outcome, can also enhance effective team work. Practising creativity techniques on actual problems that members from across different departments and teams have brought to the sessions should provide a fun and challenging environment that is conducive to creativity and team development as well as to developing expertise.

In this investigation, *Work Group Support* is demonstrated as contributing 4 percent variance to *Creativity* across the entire dataset, Model 1. However, of greater significance is the increase in contribution to 41 percent for those individuals who are very high on *Openness to experience,* Model 4. No significant contribution was evident for any of the remaining models based on *Openness* bandings. This suggests that for individuals very high on this dimension of personality *Work Group Support* is of much greater significance than *Organisational Encouragement.* For those lower on *Openness to experience* there is evidence that *Organisational Encouragement* contributes more to *Creativity.*

5.3.1.5 *Employee Involvement and Communication*

Although employee involvement are separate practices in Purcell et al's (2003) People and Performance Link Model, here combination is deemed more meaningful. Key to the substantial and highly significant discussions

of shared meaning arising from qualitative analysis is open communication with workers on organisational issues that is suggested as very positively conveying a symbolic and substantive message of trust and involvement (Marchington and Wilkinson 2008). This can include downward communications, and upward problem solving groups and project teams. Information sharing is essential to directed creative effort where staff members are expected to identify opportunities and contribute creative ideas that are sufficiently appropriate and valued to be implemented, within an open climate where they expect their ideas to be heard. There is direct relevance here to the importance of shared understanding and shared meaning and it is unsurprising that there is evidence that ideas consistent with the organisation's mission and core values are far more likely to be supported and be successfully implemented (Mumford 2000:337). However, if this is to be effective then supportive systems must be in place, such as the establishment of creativity and innovation clubs, discussed throughout this section.

Sustaining creativity demands implementation of systems to manage ideas that might not be appropriate for implementation now but in respect of which there is huge potential in retaining these for future reference. If creativity results from association of previously unrelated knowledge or ideas then there is massive potential through communication and involvement of diverse groups, such as cross-functional, self-managed teams, problem-solving groups and or project teams. Employee involvement can be top-down, bottom-up or peer associated and there is benefit if creative and innovative successes are shared between groups, perhaps in the form of a short presentation, for example to inspire others.

5.3.1.6 *Learning and Development*

Learning and development are essentially the key to HRD. There is overlap in conceptual models of organisational learning (e.g.Senge 1990; Pedler, Burgoyne et al. 1996; Marsick and Watkins 2003), the 'Thinking Organisation' (Basadur and Gelade 2006), knowledge creation and

management (Nonaka, Toyama et al. 2000), interactionist models of creativity (e.g. Woodman, Sawyer et al. 1993; Amabile 1996) and SHRM. All emphasise that humans and organisations are dynamic beings that have the potential to learn and grow together. Organisational culture and climate are of critical importance to all these concepts in terms of enhancing the social context to enable creativity (e.g. Egan 2005; Gibb and Waight 2005; Madjar 2005), changing cultures to promote innovation (McLean 2005) and understanding and leveraging individuals (Egan 2005) to develop new knowledge, skills and abilities. It is suggested,

> "What should be recognised is that these cultural values – which are also likely to attract capable, creative people to the organisation – encourage investment in their development, promote acceptance of and support for their work. Thus culture can, like structure, create a subtle and pervasive effect on the organisation's willingness and capability for pursuing new ideas by shaping staffs' capabilities and organisational learning" (Mumford 2000:337)

Of course, the focus here is on learning and development to stimulate, support and sustain creativity in the long term. It is impossible to isolate learning and development from employee involvement, communication and performance appraisal all of which are necessarily linked with shared meaning and creative requirement, the significance of which are demonstrated through this investigation. To be successfully creative and innovative an understanding of these concepts and what they mean in the context of the work organisation is a first step.

Making sense of creativity and innovation historically and in relation to famous business cases which are personally meaningful in the twenty-first century can engage interest, bringing these to life using real life examples can demystify the concepts and the processes increasing self-efficacy through the realisation that everyone has the potential to be creative. For example, this could involve bringing in an external consultant to speak to

staff collectively or it could be investment in personal development as a creativity champion with responsibility to develop other staff members. Training in a range of creative problem solving techniques with small groups on actual problems will allow staff to develop expertise and confidence in using these tools and having fun in the process, as part of supportive mechanisms including for example the establishment of creativity and innovation clubs that meet regularly. This needs to include training in opportunity and problem finding as suggested by Basadur and Gelade (2006) in relation to adaptability and flexibility. Of course, such training will directly stretch staff capabilities and introduce challenges, for example, taking responsibility for management of small projects or a single problem that they bring to the clubs. Team leaders and line managers could be trained to initiate problem solving sessions with their teams and to act as mentors for those less skilled in creativity.

Enhancing creativity is seen to depend on diverse experiences, tacit knowledge and associative relationships. Therefore, the broader the range of related experiences the greater the pool of resources on which to draw. Therefore, there is immense value in membership of professional associations and conference attendance to share in leading edge thinking relative to the field, and networking with like-minded companies.

5.3.1.7 *Performance Management, Appraisal and Career Progression*

Having recruited and developed talented staff fair evaluation, positive reinforcement and constructive criticism are critical in providing feedback. Performance appraisal must be a two-way process where aspirations of the employee are considered in relation to further development and career progression aspirations and opportunities and are critical to retaining valued staff in an organisational culture and climate where there is considerable investment in human resource management and development. The review process provides valuable opportunity for clarification of creative requirement in relation to individual and team objectives, as well as for positive and constructive feedback. By definition,

such processes are performance-led and linking challenging targets to creativity is essential and can provide a basis for discussion, learning and development. Targets might relate to the process of developing creativity skills such as participation in problem-solving groups and facilitation of group sessions, as appropriate rather than outcomes as externally imposed goals can inhibit creativity (Mumford 2000:324). The subjectivity of creativity processes and the importance of team members and others suggests that multisource feedback, or 360-degree appraisal is entirely appropriate in relation to creativity as these people can provide process information. Career progression is often based on management skills rather than creative contribution and if creativity is to be successfully stimulated, supported and sustained then consideration should be given to recognition for creative work.

5.3.1.8 *Career Opportunity*

The approach developed throughout this investigation is that of the need to stimulate, support and sustain creativity. Creativity can be stimulated through training in creative problem solving techniques in a supportive climate such that both are sustainable by becoming embedded into the organisation and reinforced through positive feedback as a result of success with potential to develop sustainable competitive advantage and growth. The model supports both personal and organisational development and transformation where workers might be seen to be creating their own opportunities for advancement, congruent with notions of the self-managed career.

5.3.1.9 *Job Security*

The expectation of creativity, high performance and high commitment without some expectation of employment security and opportunity for career development is considered unrealistic (Pfeffer 1998) and detrimental to a positive psychological contract based on mutual expectations. While jobs for life no longer exist high commitment HR practices views people as a valuable resource and places great value on a strong internal pool of labour. In such a culture, human resource planning

and flexibility combined with learning and development places value on retaining staff that invested in. In the context of a highly competitive and dynamic global business environment, such as that faced by business organisations in the current economic downturn creativity and innovation are increasingly important to survival - as well as to achieving greatness. Individuals are likely to find such skills in high demand.

5.3.1.10 *Work Life Balance*

Attention to work-life balance and flexible work practices are not new but increased interest has been stimulated in recent years via legislation and the business case for flexibility that suggests enhancements in performance and retention and reduced absenteeism. Work-life balance includes flexible work practices that, for example, might relate to hours worked, shift patterns, job sharing and home working as well as other initiatives such as childcare arrangements and minimum wage. From the perspective of managing organisational creativity commitment to work-life balance has potential to increase diversity through workplace participation and to reduce *Workload Pressure* allowing the structuring in of creative thinking time that maximises both work time and productivity. Of course, work life balance implies further opportunity for pursuing a wide range of interests that have been suggested as central to creative idea generation. Associational relationships often take place during periods of relaxation and cannot be forced during assigned work time. Time management schedules might also be useful in managing flexible work practices (Mumford 2000:318).

5.4 **Summary**

This discussion was structured around the synthesis of quantitative and qualitative findings in identifying important factors that interact in contributing to organisational creativity, extended to an exploration of how these might be supported through HRM and HRD. *Challenging Work*, *Workload pressure* and *Openness to experience* are significant to the relatively tangible measures of participants' creative idea generation and implementation. The significance of *Workload Pressure* only to these

outcomes leads to the suggestion of this factor as somewhat of an anomaly, the implications of which were discussed.

Organisational Encouragement, *Organisational Impediments*, *Challenging Work*, *Work Group Support* and *Openness to experience* interact in contributing 47 percent variance in *Creativity* between participating companies. With the notable exception of *Supervisory Encouragement*, the overall general linear model (Model 1) provides evidence that supports the five scales demonstrated to be most important to organisational creativity (Amabile 1997). Such support, employing a very different sample to that of Amabile's (ibid.) work, which focussed on a large organisation, is significant in advancing theoretical and practical understanding.

However, Amabile's model did not specifically include measures of personality and this investigation provides strong evidence suggesting *Openness to experience* as moderating the significance of KEYS scales in supporting *Creativity*. *Challenging Work* remains significant to *Creativity* across all models, the contribution being greater for individuals high and very high on *Openness*. However, *Organisational Encouragement* appears significant to all groups, except independent creators very high on Openness, where *Work Group Support* makes a major contribution.

Factors evident from qualitative analysis most closely resemble items within the *Organisational Encouragement* and *Organisational Impediments* scales, representing motivational factors deemed as supportive and inhibitive respectively of creativity and innovation at the level of the organisation and senior management. However, the findings emerging from qualitative analysis are in far greater depth, which suggests limitations of KEYS scales to meaningfully tap in to these influential factors. Factors discussed include shared understanding and meaning, active aspiration, supportive mechanisms, passion or love for one's work and freedom to voice ideas.

This thesis provides a number of unique contributions. Firstly, investigation at the level of the organisational system based on the interactive contribution of individual, social and organisational factors, rather than fragmented approaches of previous research. Secondly, empirical investigation employing the KEYS assessment of creative climate is relatively rare beyond that of Amabile, the main contributor to the development of this instrument. Combined this leads to the development of a model that supports four of the five factors identified by Amabile's (1997) research in a large organisation. The focus of this investigation on SMEs is suggested as a reason for the relative insignificance of *Supervisory Encouragement.* Thirdly, while personality characteristics feature in the interactionist models, assessment is rare at this level. This has led to the development of alternative models (Models 2-4) where the personality dimension of *Openness to experience* is suggested as moderating the contribution of climate factors. Fourthly, qualitative investigation extends the variance contributed by the general linear models to include the significance of shared understanding and meaning, the need for continuous active stimulation and supportive mechanisms, passion or love for one's work and freedom to voice ideas. All of these unique contributions extend and advance theory and practice.

Finally, this represents a significant contribution in understanding how HRM more generally and HRD more specifically might effectively facilitate creativity and its centrality to learning and knowledge management. Synthesis of creativity theories with HRM and HRD has implications for the limitations of KEYS, *Organisational Encouragement* and *Organisational Impediments* scales in particular, and for models of SHRM (e.g. Purcell, Kinnie et al. 2003), particularly in relation to employee involvement and communication, learning and development, and associated practices. Implications of this investigation at the level of the individual, the organisation and the group are illustrated in Figure 5-36 building on a foundation that synthesises the work of Amabile (1997) and Purcell et al (2003) and extended through the unique contributions evident here.

Chapter 6: Conclusions

Componential approaches to creativity and innovation emphasise the interaction of psychological, social and organisational factors. For example, Amabile's (1996) model suggests creativity results from the multiplicative interaction of motivation, domain relevant skills and creativity relevant processes with the social environment. In Chapter 2 the suggestion was highlighted that the gestalt of the creative output for the whole system stems from the complex mosaic of individual, group and organisational characteristics and behaviours occurring within the salient situational influences existing at each level of the organisation (Woodman, Sawyer et al. 1993). In the attempt to overcome problems arising from fragmented approaches that illuminate only part of the picture, a systemic approach was adopted to investigate the major factors suggested as important in contributing to organisational creativity at the individual, social and organisational levels. Multiple methods of data collection that might be conceived as combining the quantitative approach of Amabile (1996) with the qualitative approach of Kanter (1983; 1988) were employed to undertake an in-depth investigation of participating companies. In this way this study provides a number of important unique contributions discussed in Chapter 5. In summary to reiterate these include:

- Investigation at the level of the organisational system based on the interactive contribution of individual, social and organisational factors, that overcomes potential limitations of previous fragmented approaches
- Empirical investigation employing the KEYS assessment of creative climate that is relatively rare beyond the work of Amabile, the main contributor to the development of this instrument
- Evaluation of the contribution of personality characteristics that feature in the interactionist models yet assessment of which is rare

- Combined this leads to the development of a model that supports the interaction of four of the five factors identified by Amabile's (1997) research in a large organisation with *Openness to experience*.
- Development of alternative models (Models 2-4) where the personality dimension of *Openness to experience* is suggested as moderating the contribution of climate factors.
- Qualitative investigation extends the variance contributed by the general linear models to include the significance of shared understanding and meaning, the need for continuous active stimulation and supportive mechanisms, passion or love for one's work and freedom to voice ideas.
- Implications are explored in understanding how HRM more generally and HRD more specifically might effectively facilitate creativity and its centrality to learning and knowledge management. Synthesis of creativity theories with HRM and HRD has implications for the limitations of KEYS, *Organisational Encouragement* and *Organisational Impediments* scales in particular, and for models of SHRM (e.g. Purcell, Kinnie et al. 2003), particularly in relation to employee involvement and communication, learning and development, and associated practices.
- Implications of this investigation at the level of the individual, the organisation and the group are illustrated in Figure 5-36 building on a foundation that synthesises the work of Amabile (1997) and Purcell et al (2003) and extended through the unique contributions evident here.

These unique contributions extend and advance theory and practice in a number of ways, the in-depth conclusions of which are explored thematically:

- Systemic Empirical investigation of Support for Creativity
- Openness to Experience
- Workload pressure as an anomaly
- Additional variance explained by qualitative factors

- HRM and HRD in stimulating, supporting and sustaining organisational creativity

6.1 Systemic Empirical investigation of Support for Creativity

Firstly, investigation at the level of the organisational system based on the interactive contribution of individual, social and organisational factors overcomes problems associated with fragmented approaches of previous research. This is appropriate to interpretations of interactions between specific elements or combinations of elements and avoids spurious relationships or confounding factors. Secondly, beyond Amabile's work, empirical investigation employing the KEYS assessment of creative climate is rare. The development of an overall general linear model suggests four dimensions of climate for creativity and one personality dimension as significant in contributing a substantial 47 percent of variance (Model 1) between companies. With the exception of *Supervisory Encouragement* all four dimensions that contribute to the development of the general linear model are those considered most important in facilitating organisational creativity as suggested by Amabile (1997). Support for these dimensions was also suggested by another study published during the course of this investigation, and representing the only other study found to have undertaken an investigation of all KEYS dimensions, also in a UK context (Ensor, Pirrie et al. 2006).

This timely systemic investigation lends further support to the greater importance of certain climate dimensions and reinforces the value of the model. This is significant in advancing theory and to informing business organisations how to support creativity. KEYS climate dimensions suggested as less important to supporting creativity are *Freedom, Sufficient Resources* and *Work Load Pressure.* The latter appears as somewhat of an anomaly in respect of which further research is necessary to advance theoretical understanding and practice. The most important climate dimensions are *Organisational Encouragement*, *Challenging Work*, *Work Group Support* and *(lack of) Organisational Impediments*.

Organisational Encouragement represents a climate where, for example, ideas are judged fairly and constructively, individuals receive reward and recognition for creative work, there is an active flow of ideas, mechanisms are in place for developing new ideas and there is a shared vision of what the organisation is trying to achieve. *Challenging Work* is representative of intrinsic motivation resulting from the positive pressure of engaging in difficult tasks that are perceived as important to the organisation. *Work Group Support* is representative of skill diversity in a work group where there is trust, people are committed to their work, people are open to new ideas, there is effective communication and collaboration, where people constructively challenge and help each other. *Organisational Impediments* is representative of barriers to creativity through a climate where there is, for example, harsh criticism of ideas, internal political problems, destructive competition, avoidance of risk and an emphasis on maintaining the status quo. A possible explanation for the insignificance of *Supervisory Encouragement* in the current investigation is the sample of eight SMEs, all non-hierarchical.

6.2 Openness to Experience

Thirdly, an important part of the current investigation was the measurement of personality characteristics that feature in most interactionist models, but represent a relatively neglected dimension and assessment is rare at this level. The single personality dimension that interacts with climate factors in Model 1 to contribute 47 percent variance between participating companies is *Openness to experience* that refers to characteristics such as imaginative or intellectually curious. As the personality dimension most frequently associated with creativity more open individuals are not only more flexible in absorbing and combining unrelated information but also have a greater need to seek out new experiences (McCrae and Costa 1997). The present investigation provides clear evidence for the contribution of *Openness to Experience* to creativity. However, the unique contribution is the significance of this dimension in interaction with climate factors in contributing to variance between

participating companies in organisational creativity resulting from this systemic investigation.

However, the development of alternative models (Models 2-4) suggests *Openness to experience as a* moderator of climate factors, rather than a covariant. For those *low* or *very low* on *Openness* the climate dimensions of *Organisational Encouragement* and *Challenging Work* are suggested as contributing 29 percent variance (Model 2). For those *high* on *Openness* these two dimensions remain significant together with *Supervisory Encouragement* and *Organisational Impediments* in contributing almost 44 percent variance (Model 3). However, the most striking model is for those *very high* on *Openness to experience* where just two dimensions, *Challenging Work* and *Work Group Support*, contribute almost 60 percent of variance of which 41 percent is attributed solely to *Work Group Support* (Model 4). These models are supported quantitatively for the sample as a whole and qualitatively by company comparison and suggest the significance of different dimensions in supporting creativity for those low, high or very-high on *Openness.* Differential supporting factors are important in extending theory and supporting practice. *Challenging Work* is highly significant to all models, particularly for those high or very high on *Openness*. However, *Organisational Encouragement* is insignificant to those very high on *Openness*, where the support of co-workers is of greater significance to these independent creators. On this basis *Openness* is suggested as a possible moderator.

Significant associations of *Openness to Experience* with creative problem solving training are interesting and potentially informative, particularly as personality implies the significance of individual differences while CPS training very firmly suggests everyone has the potential to be creative. Evidence from this investigation seems to suggest the significance of creative personality, particularly for extreme outcome measures.

Openness to experience was also associated with all independent outcome measures of *individual and group idea generation and implementation.* Based on the combined data across participating companies (n=209) significant variance was evident for *Challenging Work, Workload Pressure* and *Openness* for banded estimations of individual and group idea generation and implementation. However, contrary to expectations no differences were suggested between idea generation and implementation or between individual and group outcomes. This is, therefore, contrary to suggestions emerging from the research literature of the need to differentiate between those characteristics that enhance idea generation and those that are supportive of the exploitation of creative ideas including, for example, high degrees of persuasion, persistence, motivation and influence. Some studies that have attempted to investigate personality in relation to specific elements of the interactionist models have provided support for the *Openness* and *Conscientiousness* dimensions of the five-factor model of personality (Costa and McCrae1985; 1992) respectively in facilitating and inhibiting creative behaviour (George and Zhou 2001). Others highlight the necessity for contrasting poles of personality dimensions (Csikszentmihalyi 1996; Feist 1998) in generating ideas of value (creativity) and recognition of those ideas (implementation).

Contrary to previous research that suggests the contribution of different factors to the idea generation and implementation processes (Axtell, Holman et al. 2000; Shalley, Zhou et al. 2004a), this investigation provides evidence for the association of *Workload Pressure* and *Challenging Work* both with *idea generation* and *implementation* rather than with different climate dimensions. However, there is no clear evidence of differentiation between individual and group idea generation and implementation. It is possible that this was in part due to the outcome measures used in this investigation, comprising self-reported estimates of individual and group ideas and implementation. An alternative explanation might be the

misconceptions of creativity and interchangeable use of terminology with innovation, both highlighted in the course of the present investigation.

6.3 Workload Pressure as an Anomaly

The significance of *Workload Pressure* to the independent outcome measures of creative idea generation and implementation is potentially important as this factor was not found to be statistically significant to any general linear models. This would seem to suggest that *Workload Pressure* hinders the generation of ideas and effective implementation but has less effect on amalgamated perceptions of climate. This is likely to be supportive of the direct effects of time pressures on cognitive processing (Amabile, Mueller et al. 2002). It is also likely that individual differences are significant to perceptions of excessive pressures. However, no statistically significant support was evident in this investigation.

The earlier discussion of cases in relation to the resulting models suggests the significance of *Workload Pressure* to climates supportive of *Creativity* while suggesting a reduced or absence of effects in less creative environments, leading to the suggestion of this dimension as a moderating factor. This bears some similarities to a recent study that investigated the possibility of *Openness* and supportive climate as potential moderators in the relationship between creative time pressures and *Creativity*. This study suggested an inverted U-shaped relationship in a supportive environment but that increased time pressure had little effect on creativity for those low on *Openness* or in a less supportive environment (Baer and Oldham 2006:968) leading to the conclusion of a multiplicative relationship. Of course, it is entirely possible that individual differences exist in perceptions of or preferred levels of time pressure. There is also some evidence that climate for innovation reduces negative consequences of a demanding work environment (King, deChermont et al. 2007). Clearly any relationships between time pressure and *Creativity* are highly complex and likely to multiplicatively interact, moderate or be moderated by climate for creativity and personality dimensions, *Openness to experience*

specifically. At this point in time our understanding of optimal versus excessive time and work pressures remain underdeveloped and this is an interesting and useful area for future research. It is likely that a focus on creative time (e.g. Baer and Oldham 2006; Isaksen 2007b) will be productive.

6.4 Additional Variance Explained by Qualitative Factors

Fifth is the qualitative investigation that extends the variance contributed by the general linear models to include the significance of shared understanding and meaning, the need for continuous active stimulation and supportive mechanisms, passion or love for one's work and freedom to voice ideas. All of these unique contributions are important to extend and advance theory and practice. Qualitative analysis of KEYS checklist items suggests the perceived significance of factors in the *'Organisational, attitudes, structures and supports'* and *'Management'* categories. The majority of reports for factors supporting creativity and innovation fell into these two categories for companies that were perceived as more highly supportive. In those companies perceived as less supportive these categories attracted the majority of reports of factors inhibiting or suggestions for improving the climate for creativity. This might be seen as reinforcing the general linear models emerging from the quantitative data analysis.

However, it is suggested that the value of this investigation lies in the analysis of qualitative data in an attempt to explain variance not yet accounted for by the quantitative models. Qualitative analysis highlighted distinguishing characteristics between participating companies some of which overlap with factors that form part of the quantitative assessment of creative climate but are qualitatively different while others are quite distinct. It is suggested that all add value to the quantitative models and extend the variance explained in a way that is useful to organisations aspiring towards creativity and with which they might meaningfully engage to gain direction on their journey towards transformation. Investigation into meaning stems originally from Storey's (2000) suggestion that while

companies are more than happy to use the terms as a public relations exercise there is all too often a lack of shared understanding among management regarding what it actually means in practice to be creative and innovative. Factors emerging from qualitative analysis fall broadly into the sub-headings outlined in Chapter 5: love for one's work, shared meaning, understanding and acceptability of risk, *Freedom* to voice ideas and mechanisms to harness creative energies. Many of these factors relate to items in the *Organisational Encouragement* and *Organisational Impediments* scales of the KEYS assessment of creative climate. However, the breadth and depth of the factors evident from qualitative analysis clearly highlights the limitations of items in these scales to effectively tap into these factors.

An important finding based on participating companies is the need for active aspiration to the stimulation and support for creativity and innovation at the level of the organisation and translated through values of senior management, as illustrated in Figure 5-36. Of central importance to this is a shared understanding of creativity and innovation and a shared meaning of how this can be achieved and sustained. Continually igniting or reigniting of support is critical to companies in the process of transformation and to those where there is a long-standing expectation, in the absence of which creativity might die out. The significance of supportive mechanisms to embedding creative and innovative practices that are sustainable, include a creativity champion, ongoing developmental training in creativity techniques, creativity and innovation clubs and support networks in addition to the significance of learning and knowledge management. Other factors demonstrated as important are fun, a passion for one's work and an absence of hierarchy that provides the freedom necessary to voice ideas without fear of humiliation, ridicule or intimidation.

6.5 HRM/D in Stimulating, Supporting and Sustaining Creativity

Finally, limitations of existing HRM frameworks in supporting creativity are suggested. Synthesis of Purcell et al's (2003) People and Performance model with Amabile's (1997) supportive climate factors, is supported and extended through this investigation (Figure 5-36). Design of HRM policies and practices need to mutually support and reinforce creative behaviour based on factors highlighted by theories of creativity and advanced and extended through this timely and significant investigation. For example, *Work Group Support* and *Challenging Work* align well with HRM practices as does evidence for *Openness to experience,* creative problem solving skills and for reward and recognition in supporting creative behaviours. Some factors evident from qualitative analysis do not map easily onto the HRM framework. However, all of these factors sit most appropriately within the broad HRM areas of *employee involvement and communication* and *learning and development* with clear implications for associated practices such as *performance management and appraisal, career opportunities* and *job security.* In this way, clear evidence is provided for important links with learning, knowledge management and HRD.

This investigation has also attempted to integrate organisational culture and psychological climate with human resource practices to stimulate and support creativity in line with an organisation's vision and values. Examples have been provided for the implications of the findings of this investigation to core HRM practices such as recruitment and selection, job challenge, team working, training and development, reward and recognition, performance management and appraisal, job security and career progression, communication, employee involvement and work-life balance might be adapted to stimulate, support and sustain creativity. Organisational cultures that stress the value of innovation, autonomy, human resources and collaboration appear more likely to produce innovative products (Arad, Hanson et al. 1997; Mumford and Simonton 1997) and cultural values are likely to attract talented creative people (Mumford 2000).

Some of the qualitative factors translate more readily into recommendations for practice than others. For example, does *love for one's work* translate easily to climate or HRM implications? *Acceptability of perceived risk* is an important yet highly subjective factor that potentially represents a massive barrier to creativity. Exploration into participants' understanding of what it means to be creative and innovative leads to important findings in this investigation. While this might in part be considered in respect of employee involvement and communication practices, models of SHRM fail to adequately emphasise the depth and breadth of their significance in facilitating organisational creativity through the need for shared vision, understanding and meaning. The contribution of supportive mechanisms represents another important finding where KEYS is extremely limited in failing to specify mechanisms beyond those for *idea generation* or *implementation*.

However, the majority of factors evident from qualitative analysis in this investigation most appropriately lie in the areas of *employee involvement and communication or learning and development.* The implications extend further still to related practices including performance management and appraisal, career opportunities and job security, as discussed in Chapter 5. In this way the findings of this investigation also highlight limitations of and have clear implications for HRM policies and practices in stimulating, supporting and sustaining organisational creativity. In danger of stating the obvious, companies must not only actively aspire towards creativity, there is a real need for stimulation, support and sustainability in developing competitive advantage. As a first step transparency is essential among managers and staff across all functions and levels to achieve shared meaning and common frames of reference with regards to creative requirement and how this translates into practice. This ties in with the suggestion that to mainstream creativity an organisation must integrate creative thinking skills with a clear-cut business need and infrastructure to encourage employees to use those skills (Basadur and Gelade 2006). However, as is apparent from the findings in Chapter 4 and the above

discussion the majority of participating companies experienced difficulties. For many this was due to a lack of shared meaning, understanding, common frames of reference or lack of awareness of creative requirement, in the absence of which an organisation's efforts to stimulate creativity through elements of a supportive climate are likely to be fraught with difficulties. Therefore, active aspiration, shared understanding and meaning, common frames of reference and creative requirement are necessary pre-requisites to successful achievement of creativity through the interaction of dimensions of a supportive climate suggested by the models and discussed in detail throughout this thesis.

An important characteristic of climate emerging from this investigation is the perceived freedom to voice ideas that was highlighted by individuals in many companies as critical to supporting creativity. The depth and meaning attached to such issues by interviewees cannot be quantified and are worthy of separate consideration. Many interviewees were very passionate about feeling free to say anything knowing they would be listened to without fear of humiliation, intimidation or ridicule. What many interviewees were referring to is individual empowerment and the perceived absence of hierarchy or status in group idea generation or decision making processes such that all members feel free to contribute. If individuals do not feel free to contribute for fear of humiliation, intimidation or status such that their ideas might be dismissed out of hand rather than respected and potentially developed in their own right or through sparking connections in others, then ultimately highly valuable and profitable ideas might be overlooked. Such aspects are often also referred to in terms of evaluation, such as avoidance of premature evaluation and deferred judgement that in practice so often prevent effect creative idea generation through early termination of the creativity process (Poincaré 1913; Wallas 1926; Osborn 1957; De Bono 1967; Parnes and Noller 1972; Simonton 2003). Sustainability is again critical here. Having not been respected, listened to, shot down, intimidated, humiliated or dismissed,

how likely is it that the individual will feel free to contribute what might ultimately turn out to be THE big idea that transforms the company?

Based on in-depth analysis and comparison of participating companies, mechanisms for developing and implementing ideas are suggested as critical to the successful achievement of a climate perceived as stimulating and supportive of creativity that is sustainable in practice. Companies that are more supportive of creativity have mechanisms in place to stimulate, support and sustain such processes. Such companies actively aspire towards creativity, demonstrate a good understanding of such processes and the need for shared meaning and creative requirement in practice, and understand the importance of elements of a supportive climate. However, the most supportive companies also put in place a number of formalised mechanisms aimed at stimulating, supporting and sustaining creativity for competitive advantage. In actively aspiring towards creativity evidence is provided for the value of a creativity champion in driving forward such initiatives. An excellent champion is likely to undertake an audit of the climate and make recommendations for improvements incrementally introduced towards the process of organisational transformation. If staff members have not been trained in creative problem solving techniques then the champion will need to plan and budget for training in a range of effective techniques that regularly reinforce and allow practice so that these develop into one's repertoire of skills. Alternatively, the champion develops such techniques and prepares to train small groups in their application so that they might be effectively applied to actual work problems.

The most supportive companies demonstrated internal and external mechanisms. Internal mechanisms might take the form of creativity and innovation clubs that meet regularly within an actively supportive climate to discuss and devise creative solutions actual work problems using techniques of structured problem solving that might then be extended to sub-groups facilitated by departmental managers, supervisors or others

committed to such initiatives. Such mechanisms serve the dual purpose of solving actual problems and providing practice in the application of techniques such that they become incorporated into individual repertories of skills and are ultimately institutionalised into the organisational culture and climate. In this way such processes contribute to staff development and ideas generated from such sessions are actively managed in a way that is intrinsically motivational and positively reinforcing. External mechanisms, for example, networking might provide additional opportunities for sharing ideas through exposure to representatives from like-minded companies, while realising associated problems of non-disclosure of sensitive information that is critical to sustaining competitive advantage.

This investigation represents a synthesis of models of creativity with strategic HRM that extends existing knowledge and understanding of the facilitative role of HRD through systemic analyses of individual, social and organisational factors that support personal and organisational development and transformation. Substantial support is demonstrated for models of creativity (Amabile 1983; 1996; 1997) through assessment of climate (Amabile, Coon et al. 1996; Amabile, Burnside et al. 1999) and models of SHRM (e.g. Barney, 1991; Purcell, Kinnie et al. 2003) while also demonstrating significant limitations in respect of both. This has been achieved through triangulation of Amabile's quantitative approach with qualitative research (e.g. Kanter 1988) and assessment of personality dimensions as measured by the five-factor model (Costa and McCrae 1985; 1992; 1995). At a broad level Amabile's (1983, 1996, 1997) model of creativity and Purcell et al's (2003) *People and Performance Link Model* both emphasise the AMO model dependent on the interaction of individual ability, motivation and opportunity. Unpacking both models therefore highlights complex variables at the level of the individual, social environment and the organisation. This represents a significant contribution in understanding how creativity might be supported through HRM more generally and HRD more specifically.

6.6 Summary of conclusions

Systemic investigation of the contribution of individual, social and organisational factors that interact in facilitating organisational creativity is necessarily highly complex yet essential in overcoming limitations of previous fragmented approaches in advancing theoretical understanding that is informative to business organisations aspiring to enhancing creativity and innovation with potential for sustainable competitive advantage. Somewhat paradoxically, the essential complexity of analysis of organisational systems precludes simple recommendations or quick fixes that managers so often seek. Conclusions of this investigation for theory and practice are broadly summarised as:

- The provision of a parsimonious model that usefully supports four organisational climate factors as most important in facilitating organisational creativity: Organisational Encouragement, Challenging Work, Work Group Support and (lack of) Organisational Impediments (Model 1). Lack of support for the fifth factor, Supervisory Encouragement, is suggested as the focus on SMEs, whereas Amabile's study focussed on a single large organisation. Descriptions of these scales and their practical implications are discussed in-depth throughout this thesis. This provides focus for managers aspiring to creativity and innovation, reducing emphasis on those factors that are of lesser significance.
- Confirming the significance of the personality dimension of *Openness to Experience* in interacting with four climate dimensions (above) in supporting organisational creativity (Model 1).
- Highlighting the need of different factors in supporting organisational creativity dependent upon individual differences in *Openness to Experience* (Models 2-4). Simply, for those lower on this personality dimension, climate factors are necessary in supporting creativity and innovation. Those very high on this personality dimension appear to be independent creators where Work Group Support and Challenging Work are of greater significance.

- Identifying the significance of additional factors beyond those measurable through climate surveys. For example, love for one's work, understanding the meaning of creativity and innovation, shared meaning, creative requirement, freedom to voice ideas, and mechanisms for developing and implementing creative ideas.
- Highlighting the need for understanding and meaning of creativity and innovation in the organisational context.
- Highlighting the significance of positive pressure (Challenging Work) versus the anomaly of optimal rather than excessive time or work load pressures.
- Provision of practical implications through the translation of factors to HRM and HRD practices. Figure 5-36 supplements and illustrates contributions and interactions evident from this investigation in a way that assists managers to transform the rhetoric of creativity and innovation into a reality.

6.7 Limitations

However it is also necessary to recognise the limitations of this contribution as a systemic, comparative investigation of small-to-medium sized business organisations. Substantial values of this investigation are the unique contributions discussed above in an attempt to explain additional variance beyond that of the general linear models through qualitative analysis. This has resulted in important implications both in respect of limitations of the KEYS assessment of creative climate and in respect of limitations of HRM policies and practices in supporting creativity. A test of the findings reported here would be whether the overall general linear model (Model 1) and/or the three alternative models (Models 2-4) based on personality bands can be supported through further research. Another will be whether the findings emerging from qualitative analysis achieve support in other contexts in explaining additional variance beyond that of the resulting models. This calls for further systemic research not only in organisations of a similar size to those employed here but also in larger organisations. The contribution of this investigation in

developing a model (Model 1) that reinforces factors indentified in Amabile's (1997) work on a large organisation as most important to support creativity suggests this is promising. Large-scale longitudinal investigation at the level of the organisational system would add considerable value.

Combining quantitative and qualitative approaches, the present investigation has highlighted some limitations of the KEYS survey. Therefore, adaptation of this instrument is recommended. Based on this investigation it is suggested that questions relating to *Sufficient Resources* and *Freedom* are removed, as there is little evidence for the contribution of either. Remaining questions could extend to include factors arising from qualitative analysis. It is also suggested that the Workload Pressure dimension be retained and adapted to include creative time (e.g. Baer and Oldham 2006; Isaksen 2007b). For use in the UK it is also recommended that wordings of questions are adapted to be more meaningful to participants.

Meaning and value are central to the present investigation and have resulted in important findings extending quantitative analysis. However, exploration of meaning and value has also highlighted limitations of this research. For example, it has highlighted misconceptions of creativity among business organisations and interchangeable use of terminology with innovation. It is possible that this has confounded attempts to differentiate between individual and group idea generation and implementation outcomes in the present investigation. To overcome such limitations it might be necessary to define meanings for participants in advance of data collection. Of course, this would not preclude qualitative investigation of meaning and value.

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APPENDIX A

SEMI-STRUCTURED INTERVIEW QUESTIONS

AND

QUESTIONNAIRES